COMMA

THE EEC REGISTRY OF SPOT TRANSACTIONS

FINAL REPORT

Prepared for:

The Directorate-General of Energy

Commission of the EEC Brussels

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COMMISSION
OF THE
EUROPEAN COMMUNITIES

DIRECTORATE-GENERAL FOR ENERGY

Oil Supply Group

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COMMA

The EEC register of spot transactions

Summary and Conclusions of the Final Report

Prepared by Joe Roeber Associates

Introduction

1. In the last quarter of 1978, following disruption of crude oil supplies from Iran, the spot prices of oil products in Europe rose sharply and thereafter showed violent instability. Main market prices also rose, but more slowly, as the effects of shortages and increased crude costs made their ways through the supply system. But it was "Rotterdam" that attracted public attention and to which was attributed part at least of the blame for the turbulence in the market.

2. In March 1979, the European Council and the Council of Energy Ministers decided that there was a need to understand the workings of the spot market more fully. A voluntary register of spot transactions was suggested. It was to be modelled on the "Checkrun" of 1978 but would be broader in scope, covering Mediterranean prices as well as those in Northwest Europe (NWE). With the promised support of important German traders, members of the Aussenhandelsverband fuer Mineraloel (AFM), it would also have a broader base of participation in the industry. The most important difference with the Checkrun was that, whereas the earlier register was intended to validate published price reports, the "COMMA" exercise (Commission Market Analysis) was intended to monitor the operations of the market.

3. COMMA ran for a year, from June 1979 to May 1980. 57 companies participated, reporting their spot transactions to the Commission's auditors weekly. A statistical report on prices and volumes was prepared weekly by the auditors; a monthly report on market developments was prepared by the consultant to the Commission; this final report looks at the operations of the market over the year as a whole. The COMMA exercise took place in a year that was of uncommon interest because of the turbulence in the oil market, but it was untypical of trading in more stable conditions.

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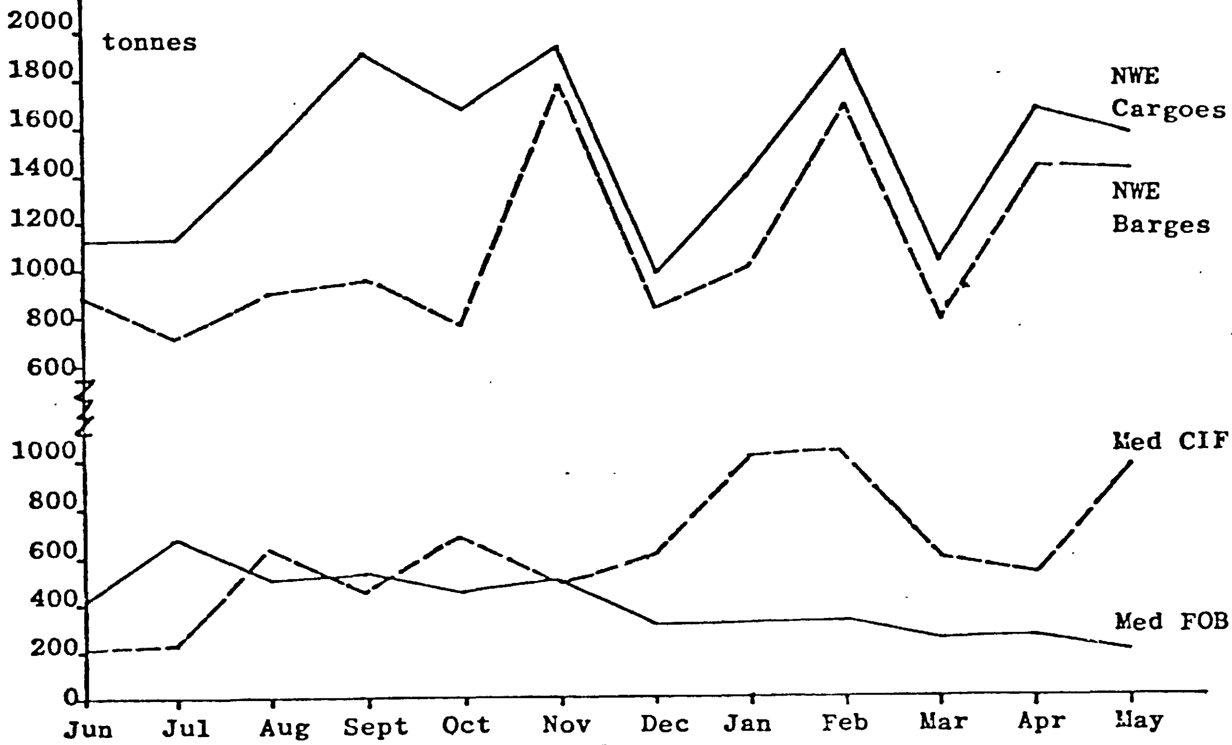
The Structure of the COMMA Trade

4. The volume of spot transactions reported to the auditors during the COMMA year was 48 m tonnes. Excluding reports that did not conform to the rules, there were some 8,000"valid transactions" to a total volume of 43 m tonnes. NWE reports accounted for three-quarters of this volume and Med reports for a quarter. Figure 1 shows the development of COMMA trade by month in the four reporting areas.

Figure 1 COMMA TRADE BY MONTH: ALL PRODUCTS



It will be seen that the trade is characterised by large changes between periods: for example, the level of barge traffic, which averaged 1.1 m tonnes per month, three times changed by nearly 1 m tonnes between months. On a weekly basis, the movement is even more random - illustrating one of the features of a marginal trade. After the first four months, NWE barge and cargo traffic moved closely together. Med reports moved apart: between the two halves of the COMMA year, FOB (export) volumes went from 3.1 m to 1.6 m tonnes and CIF (import) volumes from 2.7 m to 4.9 m tonnes, reflecting changes in the relative attractiveness of the Italian domestic market.

5. Table 1 below shows volumes reported from the four areas, by main product groups.

TABLE 1: COMMA TRADE BY REPORTING AREA

(m tonnes)	NWE		Med		TOTAL
	Cargoes	Barges	FOB	CIF	
Mogas	1.3	1.2	0.9	0.1	3.6
Naphtha	4.7	0.9	0.3	0.9	6.9
Gasoil	4.4	8.0	1.4	2.4	16.2
Fuel Oil	7.4	3.0	2.0	4.1	16.5
TOTAL	17.4	13.2	4.7	7.6	43.2

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Taking the spot trade as a whole, the main products in trade were fuel oil and gasoil, each accounting for 38 per cent of the total. Within the fuel oil share, the volumes were divided roughly 2:1 between high and low sulphur grades respectively. (The inclusion of a "Max 2%" intermediate grade revealed little trade.) The much smaller mogas trade was also divided, between premium and regular grades; the former is by far the more important, and accounted for more than 80 per cent of total mogas volumes.

6. Differences in the product mix between the reporting categories are of more interest, because more revealing, than the overall shares. Although there are areas of overlap, it is apparent that the markets are to some degree separate and have different structural characteristics.

   i. The barge trade is predominantly one of gasoil: 61 per cent of barge volumes reported. The naphtha share was low (7 per cent). Of the large (22 per cent) fuel oil share, nearly a half was of low sulphur grades.

   ii. Cargo reports showed fuel oil with a 41 per cent share, of which more than half was of high sulphur grades. Naphtha and gasoil each accounted for a quarter.

The two most striking differences here - the gasoil share in barges and naphtha share in cargoes - are both consistent with the nature of the markets. Barges are more of a traders' market, as the breakdown of participants' reports below shows: it is dominated by the requirements of Germany, in which the market for home heating oil (gasoil) is the staple of a large independent sector. Refiners are more important in the cargo market; it is also an import market, and naphtha is mainly an import product which goes to large industrial end-users. (Cargo reports accounted for 41 per cent of the COMMA total and cargo naphtha accounted for 68 per cent of total naphtha.) Thus, broad differences between the two reporting categories arise directly from their markets and the nature of companies' participation. Differences between the two Med reporting categories are of another sort.

   iii. The most important products in the FOB trade were fuel oil (44 per cent, of which 64 per cent was high sulphur) and gasoil (30 per cent). The mogas share was the largest in the four areas, at 16 per cent.

   iv. Virtually all of the CIF reports were in three products: fuel oil (55 per cent), gasoil (32 per cent) and naphtha (12 per cent).

Italian exports come from refineries that exist for the purpose and which therefore tend to export across the barrel. The pattern of imports is determined by Italian demand at the margin. Over the COMMA year, the balance between the two swung: first, as the government intervened with subsidies to offset the effect of the low controlled price for gasoil; and, second, as the rising spot price of crude made it attractive to import straightrun fuel oil for cracking.

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7. There are normally well-marked changes in the pattern of demand between seasons: Summer is the mogas season and Winter the heating oil season. Consumption reflects these patterns faithfully but - with the intervention of stock changes - the responses of refinery runs, international trade and, finally, spot sales are progressively attenuated. Nonetheless, seasonal changes in the pattern of spot sales are marked, and often exaggerated. Given the small volumes involved, the pattern can be distorted. For example, both cargoes and barges showed increases in mogas sales beyond the normal seasonal peak, probably as a result of strong demand from the US. Although the spot trade takes place in the context of the oil trade generally, its behaviour is not necessarily consistent with nor to be predicted from consideration of the market as a whole. The spot trade exists at the margins of the larger supply systems, and small shifts in supply or demand can produce disproportionate effects.

8. COMMA reports were analysed according to the type of participant, each company having been invited to choose one of five categories defined by the Commission and intended to distinguish primarily between levels of integration. Analysis of reports for trade in all products and for gasoil, in NWE cargoes and barges, showed important differences and provided confirmatory evidence about the nature of the trade in the different markets. The main conclusion concerns the relative importance of refiners and traders in cargo and barge trades, refiners accounting for more than half of the reports in the former and a third in the latter. The proportions of traders (groups 3, 4, and 5) in COMMA reports were 38 per cent and 56 per cent respectively. These differences were almost entirely accounted for by gasoil reports: refiners accounted for 45 per cent of cargo reports and 22 per cent of barges while traders accounted for 45 per cent and 67 per cent respectively.

Market Structure

9. The volume of valid transactions reported during the COMMA year was 43 m tonnes (of which 31 m tonnes NWE transactions). Given the size and composition of the reporting, it is fair to guess that this covered a substantial majority of the spot trade in Europe. To estimate the total requires knowledge of trade not included in the COMMA reports, which is to say trade between non-participating companies. (Part of non-participant trade was included in participants' reports.) After discussion with a number of participants, the unreported NWE spot trade was put at approximately 10 m tonnes, giving an estimate for the total NWE spot trade of 40 m tonnes. An estimate was not attempted for the Med spot trade, which is a less developed market about which far less is known.

10. This is a measure of activity. Individual product parcels may be several times traded, so that the net volume of trade through the spot market is invariably less - how much less depends on the velocity of circulation of products in the market and this, in turn, depends on market conditions. At the time of the COMMA exercise trading interest was high. Applying one conservative estimate of velocities to the spot trade estimated above gives a net spot trade in NWE of 20 m tonnes. In 1978, a similar procedure based on Checkrun data yielded an estimate for the net spot trade in NWE of 30 m tonnes. The numbers cannot be exact, but the impression - of greatly reduced spot trade - almost certainly is. During much of the COMMA year, product was short; many companies preferred to balance in the market by exchanges rather than by buying and selling, in order to maintain volumes.

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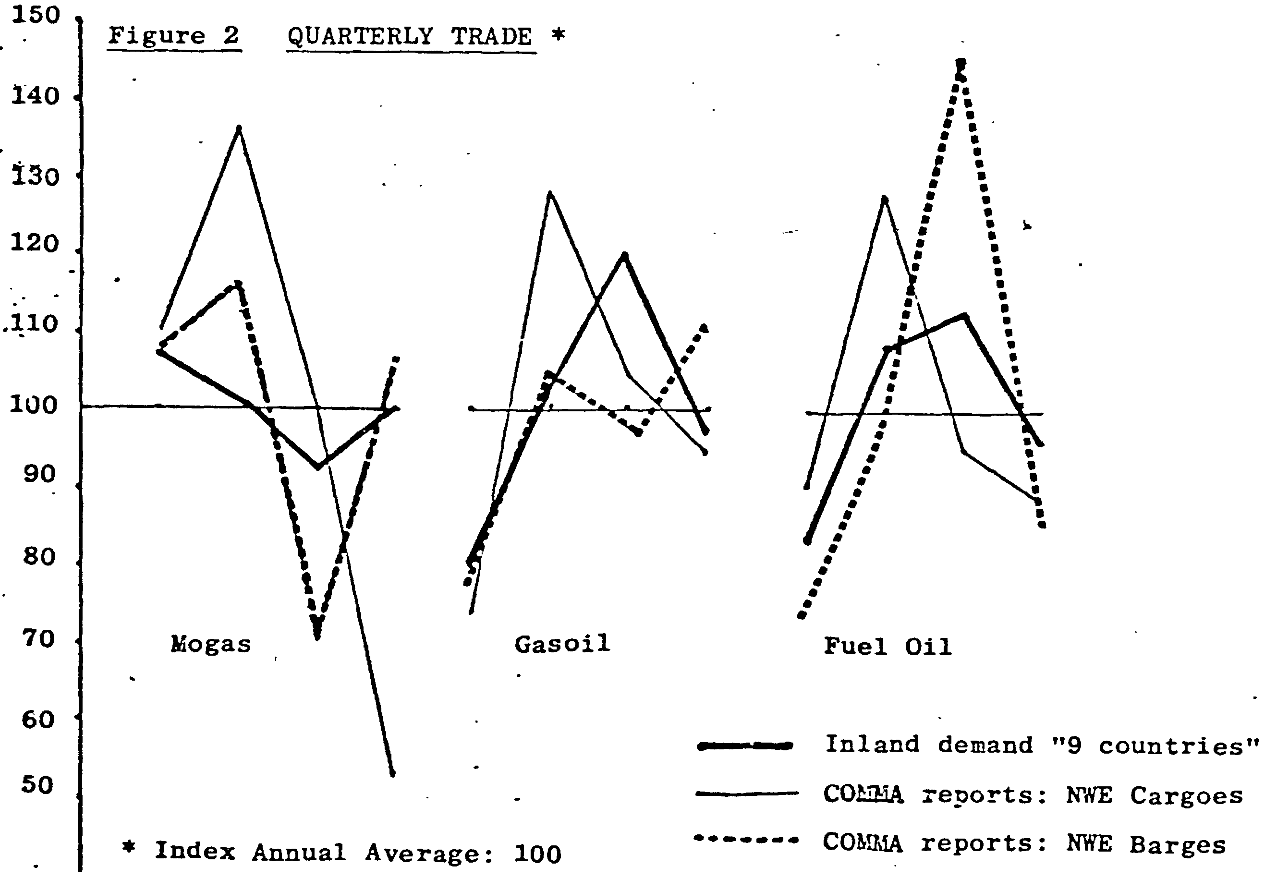
11. The spot trade should be seen in context of the NWE trade in oil products more generally. During the COMMA year, inland deliveries to NWE countries (EEC minus Italy plus Sweden and Switzerland) were 410 m tonnes, so that the spot trade, as estimated above, accounted for 5 per cent of the total. If trade was untypically depressed in the COMMA year, this suggests that more normal levels may be in the 7 to 8 per cent range. This trade is not evenly spread. Participation in the spot market is a function of a number of factors, of which the most important are the extent to which a market is out of balance with its refinery output and the size of the independent sector. Neither of these is definitive: much the greatest part of balancing takes place within and between the integrated systems: even a balanced market provides opportunities for traders; and independence must rely upon term contracts with local refiners. Nonetheless, an examination of inland demand, refinery output and trade flow provide the relevant context for the spot trade.

12. The volumes of spot trade are much smaller than those of the term and inter-affiliate trades in which they are embedded. Nowhere does the spot trade emerge into the open nor does its behaviour conform to the behaviour of the larger flows. As the marginal trade - a small difference between large numbers, each of which can vary independently - it is liable to move violently. How different the spot trade is can be demonstrated by putting it in the context of the oil market as a whole, considering two features of the industry: composition of trade and seasonality.

Figure 2 QUARTERLY TRADE *



* Index Annual Average: 100

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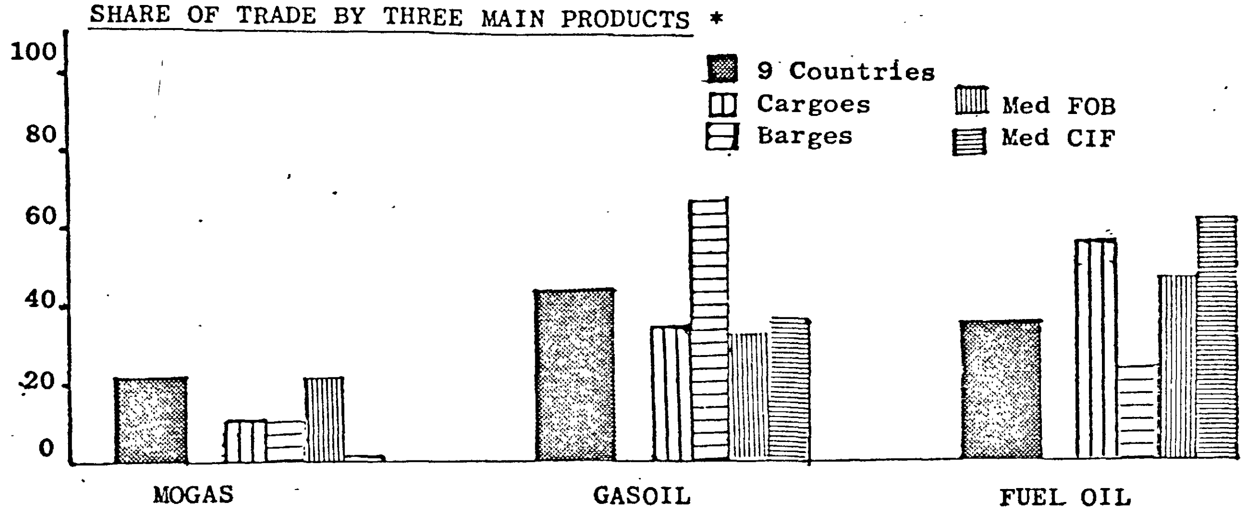
i. Figure 2 shows that there is no match in the development in demand for the three products during the four quarters of the COMMA year between the COMMA reports and the European market as a whole. Although the main markets followed their seasonal course, spot volumes moved abberantly, responding in a heightened way to the pressures of demand at the margin.

Figure 3

SHARE OF TRADE BY THREE MAIN PRODUCTS *



* Expressed as percentage of the total of the three products.

ii. Simplified product profiles of European demand and the four COMMA reporting areas are similarly contrasted in Figure 3 above, in which the same three products are considered. It will be seen that in the four reporting areas, the share of each product differs both from that in the market as a whole and from that in other reporting areas, supporting the conclusion above. The 'spot market barrel' is always different from the overall 'demand barrel'.

Neither in terms of the composition of trade nor in terms of the response of the market to changes in the trading environment does the spot market match the main markets. It is separate, existing at the margin of the larger markets it serves, and must be viewed separately.

COMMA Prices

13. During the COMMA year, prices moved widely and rapidly even by the standards of the volatile spot market. Figure 4 shows the development of weekly weighted average prices.

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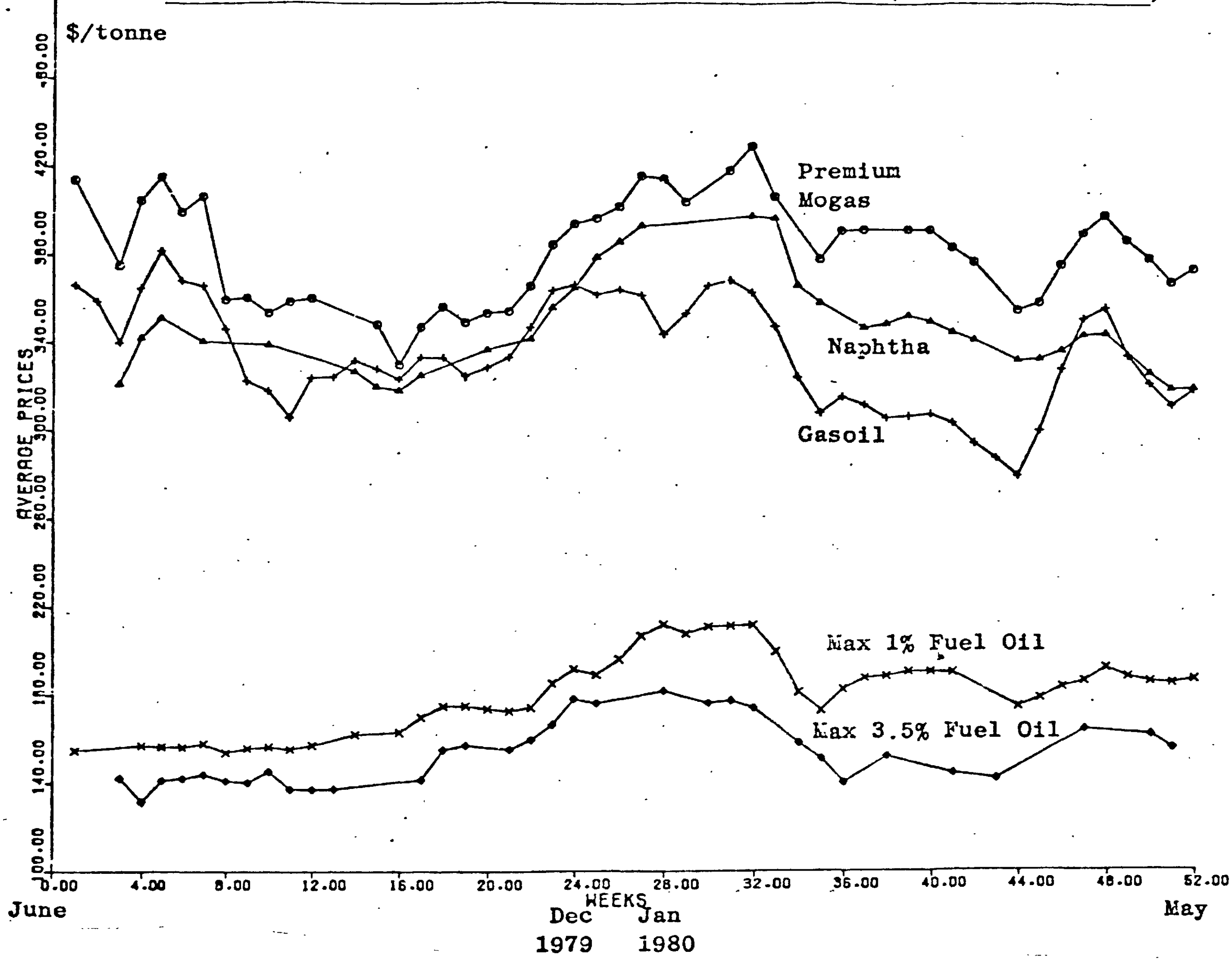
Figure 4

THE DEVELOPMENT OF PRICES THROUGH THE COMMA YEAR (WEIGHTED AVERAGES)



At the beginning of COMMA, light product prices were high. They then declined for four months. (The drop in gasoil prices in the first three months was particularly steep). Meanwhile fuel oil prices rose steadily. All prices rose from September onwards to a peak at the turn of the year; and thereafter declined again, although there was a sharp recovery in March and April, to the end of the exercise. These movements were all part of the general and continuing confusion in the oil market that had followed the disruption of crude supplies at the end of 1978. Apart from the historically high levels, price relationships were tested: sulphur values (based on the price differences between high and low-sulphur grades) fluctuated arbitrarily; for several months the price of naphtha was below that of gasoil - not unknown, but unusual. It was in short, a most exceptional year in terms of price movement, and provided a severe test for price reporting systems.

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14. The weekly price reports from the COMMA auditors consist of statistical record of actual prices in the spot trade: the highest and lowest price of the week and the weighted average price of all transactions for a product. The price for each transaction is set by the interaction of market, technical, financial and logistical factors. In addition there are less easily definable factors arising from, for example, the existence of stable trading relationships (which can create zones of reduced competition) and a buyer's or seller's short-term situation (which can give rise to distress transactions). The result is a wide and variable range of prices which, in the form of COMMA reports, could be expected to have the following properties: movements in weighted average prices that reveal market developments, with the superimposition of fluctuations resulting from random changes in the composition of trade; wide and random price movements at the extremes; and a spread of prices between high and low that encompasses the full range of quality and other price-determining conditions.

15. By contrast, published price series are not statistical reports but subjective assessments based on daily telephone contact with companies active in the spot market. Moreover, as the Checkrun analysis showed, they are prices for carefully selected, relatively narrowly-defined, typically-traded grades. As a result, although published price series take the form of "highs" and "lows", they do not cover the full trade nor do they provide an indication of the average price of trade in a product. The resulting price series are narrower in range and move less violently than prices in actual trade, as a result of the "smoothing" and other subjective factors in making an assessment. Statistical comparisons between COMMA prices, daily prices from "Platts Oilgram Price Service" (Platts) and "Petroleum Argus" (Argus),and the weekly prices put out by the AFM confirmed these broad differences in the properties of the different kinds of price series.

16. Although it was not the primary purpose of the COMMA exercise to repeat the validation of published prices undertaken in the Checkrun, price series were nonetheless statistically compared. There were not enough observations for statistical comparisons of more than a few price series: 9 out of 14 possible NWE reports and none in the Med. This confirmed Checkrun conclusions about the unreportably thin trade in certain products in the NWE and cast doubts on the validity of providing Med price reports on a daily basis. As expected, the analysis showed large differences at the highs and lows, where the price series are not strictly comparable. Of more importance was the analysis of the placement of published price reports. If it is to be accepted that a published price should not be taken as the actual "high" or "low" for the day's trade, and therefore cannot be compared with COMMA prices, a more relevant criterion of representativeness would be the location of the published range across the distribution of actual (COMMA) prices. Estimates were prepared of: the amount of trade outside the published range; the amount of trade below the midpoint; and the differences between COMMA weighted averages and the midpoint. The results are very detailed and cannot be summarised. Suffice it to say that, even at the centre, price reports showed wide differences. Thus, out of 25 comparisons, only 12 showed average weekly differences of less than $5 between midpoints and weighted averages. Even these are very large differences. They should be seen in the context of the Checkrun analysis, where a $2 difference at the extremes was taken to be the criterion for closer examination, and differences at the centre of the range were typically much smaller.

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Platts and Argus were not to be distinguished in accuracy; both showed large differences from COMMA prices, although Argus appeared to be the better-located in the COMMA distribution. AFM prices, which are closer to COMMA in methodology, being a statistically-based report, also showed large discrepancies. These results highlight the difficulties of reporting prices in turbulent conditions.

17. The prices were analysed to see if there were any systematic patterns of leads and lags. No leads were identified, which is not surprising considering that weekly aggregates were being used and any leads would more likely have been measured in days. But there was some evidence of lags, which is to have been expected from reports that are, in their nature, historical. When prices move rapidly, making assessments becomes more difficult and the assessments themselves more approximate. This is probably the single most important reason for the large differences between published prices and the actual trade. But this is only to identify the fundamental deficiencies in the published price reporting systems, which are inherent in the methodology.

Spot Prices and the Market

18. Spot prices are important for two sorts of reasons: economic and political. As the marginal, balancing trade of the oil industry, the Rotterdam market might be expected to have an important economic role. In fact, it did not acquire it until the years 1974 to 1978. Before then, prices were much more within the control of large integrated companies; the market was a "term market" and the stable cost structure of the industry was reflected in long-term, fixed price contracts. During the slack years up to 1978, price-making moved to the margin of the industry and the practice of linking contract prices, directly or indirectly, to published spot prices (mainly Platts) became widespread. Hence the interest in Platts, and hence the Checkrun. At the same time, Rotterdam prices have a more political interest because of their conspicuousness and volatility and because, at times of great confusion in the market as in 1978-1980, it may appear that a handful of Rotterdam traders are able to profit at the expense of the consumer. Given the political importance that price controls have assumed, it is to be expected that governments would take an interest in the Rotterdam market, as well as newspapers.

19. Comparisons were made between the consumer prices published by the EEC Commission and COMMA prices. By the beginning of COMMA, spot prices were already at levels that were well above and for some products (e.g. gasoil in France and Italy) as much as twice the untaxed price to the consumer. Consumer prices rose as cost increases in term crude supplies made their ways through the supply systems. By the end of the COMMA year, consumer prices were above spot prices except in the strictly controlled markets of France and Italy. Inasmuch as spot products were a part of the supply picture, spot prices would have played a part in this process. Whether they led prices up is another question. Statistical analysis of price movements, comparing COMMA with consumer prices in the individual countries, did not reveal any systematic pattern of leads. However, given the complexity of the linkages between the spot and main markets, it is perhaps not to be expected that a coherent statistical relationship would emerge. Nor is it necessary to assume a relationship in which spot prices actively led those

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of the main market. Both spot and main markets operate within common constraints of supply and demand - to which both respond, but in different ways. Spot prices, being shallowly-based, respond more rapidly and more exaggeratedly (it has been said that they amplify the signals from the market); main market prices, being based on much larger flows and more stable costs, not to mention the constraints of government price regimes, move more slowly. The observations of the COMMA year are consistent with this perspective.

20. The relationships between product and crude prices was also of interest, for analogous reasons, although the linkages are very much more complex - being mediated by the economics of refining. Again, there were political as well as economic elements in the interest since reference had been made by representatives of producer governments to the level of prices in the Rotterdam market as part of the justification for increases in crude prices. But, by the time COMMA started, the margins on refining spot crude for the spot market were negative. (For a few months earlier in 1979 it had been possible to do so profitably.) Thereafter, they remained negative; spot crude had become part of the supply pattern of large integrated companies which were able to average the high spot premium in with term supplies at much lower Government Selling Prices. In fact, the relationship between spot product and crude prices is tenuous at best, for two reasons: spot crude and spot product markets are quite separate; and not many refiners make a practice of running crude entirely for the spot market. (The mismatch between the product profiles of the spot and main markets is a demonstration of this fact.) The period at the beginning of 1979 was, therefore, highly unusual. The assumption that a link between spot product and crude prices exists such that the former leads, or at the least destabilises, the latter also requires the assumption that producers need some external indicator of value in justification of a price rise, also that they would not make increases without it. These assumptions may be plausible but they are not necessary. As with the apparent linkage between spot and main market prices, it is only necessary to observe that the markets for crude and products are subject to some of the same influences, to which they respond in ways that are directionally similar but not mechanistically linked.

21. Where interest in spot product prices could usefully be extended, however, is in the relationship between spot prices and futures. The practice of linking, referred to at the beginning of this section, is <u>de facto</u> a hedging operation designed to ensure that a company's supplies are at a price that does not put it at a disadvantage to its competitors. The COMMA analysis shows that a small, but significant, part of spot transactions are made on a quotations-linked basis. It is presumed that these are deals made for delivery some time in the future. As the future becomes the present, for immediate delivery, "futures" become spot prices. A futures market is in action at the New York Mercantile Exchange and others are being considered in Chicago and London - all for a limited range of products. These developments are of considerable relevance to the spot market, although in no way competitive.

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Conclusions

22. The following conclusions may be drawn from the COMMA analysis:

i. The NWE and Med spot markets are small in relation to the total trade in oil products in Europe. They serve the function of balancing supply and demand at the margin.

ii. As small, shallowly-based markets, they are capable of responding with extreme rapidity to any changes. All the defining aspects of their behaviour - volumes, composition of trade and prices - are volatile showing wide, rapid and random changes, period-on-period.

iii. Although linked to main markets, because existing at their margins, they behave quite differently and do not match them in any respect.

23. As far as prices are concerned:

i. An analysis of spot prices in relation to published price series confirms the main conclusions of the Checkrun report.

ii. The turbulent market conditions of the COMMA year tested the capacities of the published price series to the limit and underlined the imperfections of a system of subjective assessment.

iii. There was no rigorous statistical evidence that spot market prices exert a direct influence upon main markets, although a connection obviously exists.

Chapter One

COMMA: THE EEC REGISTRY OF SPOT TRANSACTIONS JUNE 1979 TO MAY 1980

Introduction

1.1 After consideration of the supply difficulties in the market for crude oil that followed disruptions in Iranian production from November 1978 onward, the European Council and the Council of Energy Ministers concluded in March 1979* that there was a need for the Community to ensure that developments in the market were fully understood. In particular, there was a need to ensure that spot market activities and prices could be appraised in their proper context. To this end, it was decided to reintroduce the register of spot transactions operated in 1978 under the name "Checkrun", but with modifications.

i. Whereas the primary focus of the Checkrun was on prices, specifically on the validity of published prices, the aim of the new register would be to monitor the operations of the market in order to gain deeper understanding.

ii. Its scope would be broader. Coverage was to be extended to cover Mediterranean as well as Northwest European transactions; a wider base of voluntary support would be solicited from companies active in the market.

After meetings with the industry, the exercise - called "COMMA" (Commission Market Analysis) - was set up with the same auditor and consultant as for the Checkrun. It started on June 4th 1979 and ran for a year, to May 31st 1980.

Rules and Procedures:

1.2 As with the Checkrun, the form of the rules and procedures agreed between the Commission and participating companies was set by the need to achieve two objectives: transparency in operation and confidentiality for the participants. Briefly, participants agreed to report all spot transactions falling within the agreed specification to the auditors, who aggregated it and derived information on prices, quality and volumes traded. The products covered were the same as for the Checkrun: premium and regular mogas (motor gasoline) naphtha, used for making mogas and petrochemicals; Gasoil, mainly heating oil but with some diesel also traded; heavy fuel oil, reports were, as before, distinguished by sulphur content with Max 2% and, for the Mediterranean, 0.5% added to the more standard Max 1% and 3.5% grades.

1.3 Participants reported transactions for these products in four reporting areas:

i. <u>Northwest Europe cargoes:</u> the trade into the ports around the North Sea; further divided into reports from Hamburg/Bremen, the UK East Coast (later extended), the ARA range of ports - Antwerp/Rotterdam/Amsterdam - at the mouth of the Rhine and Le Havre.

*At meetings on March 12th/13th and 27th respectively

ii. Northwest Europe barges: the trade from (and within) the ARA ports upriver, mainly to Germany and Switzerland.

iii. Mediterranean FOB: an export trade, mainly from the Italian islands refineries. The Italian West Coast and Islands were treated separately in order to generate data directly comparable to the published price reports for the Med.

iv. Mediterranean CIF: and import trade

Full details of the reporting rules, definitions of valid transactions and method of deriving the price reports are given in the COMMA Summary, provided by DG XVII.

Participants

1.4 The Commission invited 173 companies - all but two of them located within the EEC - to attend preliminary meetings. About a third of them (57) subsequently volunteered to participate in the exercise, compared with 33 in the Checkrun. They included all but one (Petrofina) of the major refiners, and a number of smaller ones: of 20 participating refiners, 8 were Italian. As with Checkrun, the major buyers of naphtha outside the oil industry - the large petrochemical manufacturers - were well-represented. Important additions to the Checkrun list were:

i. Traders, notably the German traders (members of the AFM).

ii. Companies active in the Med: 13 of the participants were Italian of which 2 were in Checkrun.

Participants are listed in Annex 5.

1.5 An objection to an exercise of this sort might be that it was unrepresentative, particularly of traders. But, although a number of important traders did not participate, such objections can be at least partly met on the grounds that participants and non-participants are competing for supplies and outlets in the same arena; moreover, they are trading with each other. Price reports, therefore, arguably represent an unbiassed sample from the market as a whole; and part of non-participants' trading volumes are picked up in participants' reports. However, where specialist traders are concerned, this may not fully apply. These points will be picked up in the course of the study.

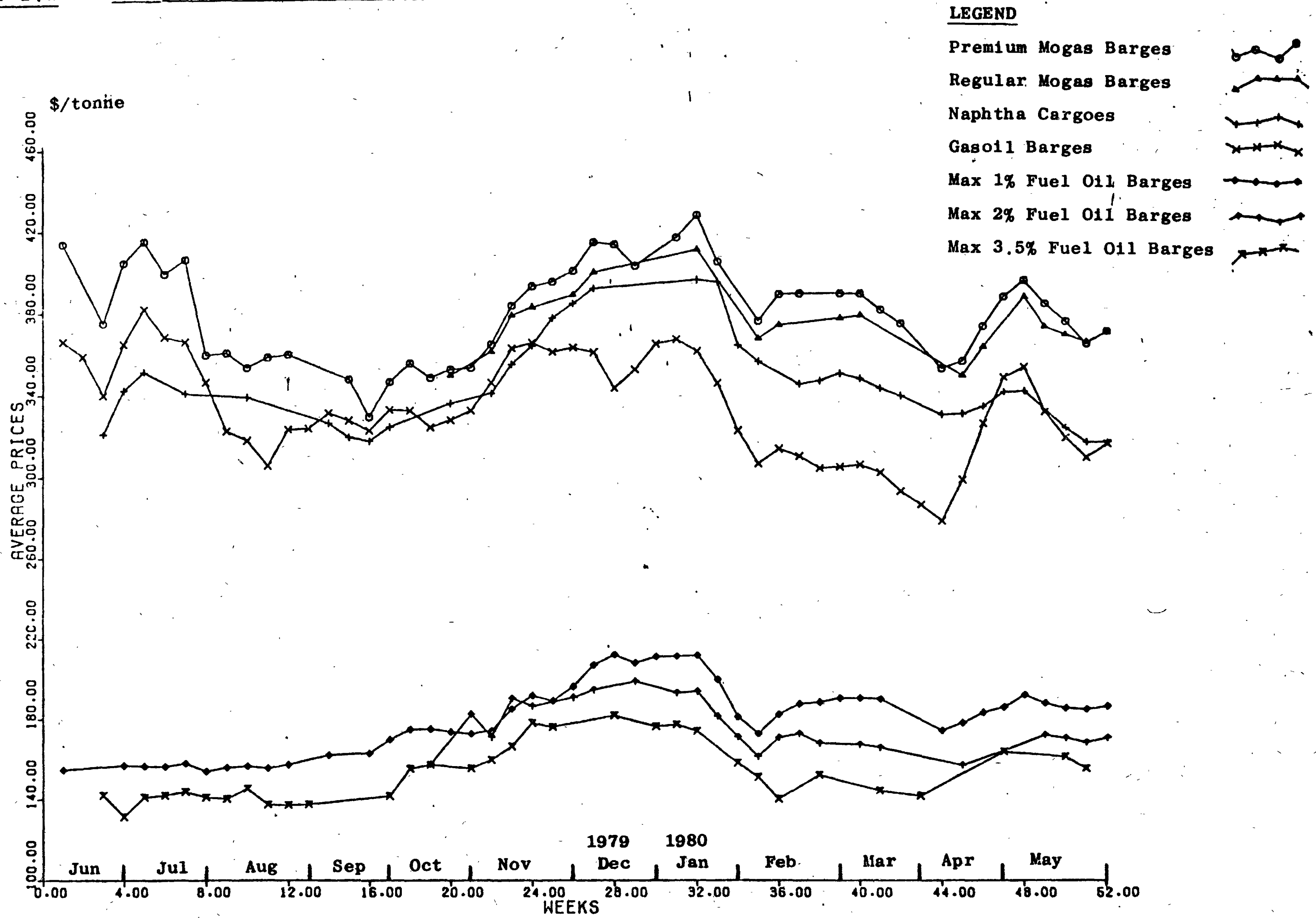
Reports and Timing

1.6 Participants reported to the auditors weekly, by the Wednesday following the week in question. The auditors sent back price reports, by telex, on the Tuesday of the next week. Thus participants reported out between 4-10 days after and received the price report back 11-17 days after the transaction date. The telex included the following data by product, by reporting area:

i. Prices: high, low and weighted average

ii. Quality data for transactions at the extremes.

CHART 1.1 THE DEVELOPMENT OF PRICES THROUGH THE COMMA YEAR (WEIGHTED AVERAGES)



iii. Volumes and numbers of transactions underlying price reports.

iv. Transactions overview: volumes and numbers reported to the auditors; volumes excluded from statistical processing.

v. Valid transactions excluded because the price was "quotations-linked".

Distinctions between categories in volumes reported (iii, iv and v) are explained in Chapter 3.

1.7 A report was prepared each month by the consultant to the Commission, based on information from the weekly telexes which was supplemented by information from companies active in the market and from the trade press. The periods covered were not calendar months, but four or five-week periods corresponding to them as nearly as possible. The consultant's reports provided a continuing analysis of developments in the market, interpreted in the light of the COMMA reports, and comprise a record of the market over a period. They were designed to contribute to the understanding of market activities that the COMMA was intended to achieve.

1.8 In this final report, the COMMA year is treated as a whole for the purposes of statistically analysing prices, and by quarters for the purposes of analysising structure. It does not describe or discuss the developments in the market over the period, which is already covered in the other reports. Nor, while prices and price relationships are fully analysed, is there any attempt to repeat the work done in evaluating the published price series in the Checkrun report.

Chapter Two

THE EUROPEAN TRADE IN OIL PRODUCTS: THE CONTEXT OF THE COMMA EXERCISE.

INTRODUCTION

2.1 The spot trade, reported by COMMA, should be seen in the context of the total trade in oil products. This is described, using 1979 data, in terms of:

i. Inland product demand.

ii. Refinery production.

iii. Trade, with intra-EEC flows distinguished from the rest.

The aim is to distinguish markets by size and in terms of their roles as exporters and importers of products. The countries in the analysis are EEC members, whose governments have supported and defined the COMMA exercise, with the addition of Sweden and Switzerland, both of which are large importers from the Rotterdam market. The group includes countries with quite disparate relationships to the spot market, for example: Germany, a heavy importer; France, which is roughly in balance; and Italy, an important exporter.

2.2 Individual product streams are analysed, also for 1979, in order to identify the main balancing flows within and between the EEC. Trade between countries represents the effort required to bring production into balance with demand. Since the spot trade consists of the balancing that takes place at the margin, this is the relevant context in which it should be considered. The analysis highlights the very strong differences between product markets, for example between gasoline, which is relatively little traded across frontiers, and gasoil, by far the most important product in the spot market.

2.3 A less detailed picture is drawn for the four quarters of the COMMA exercise, June 1979 to May 1980, for the EEC and Sweden. Trade and other data not available for the fourth quarter have been estimated. The purpose of this analysis is to provide a context in which the variations in COMMA reports can be evaluated and the seasonality of different markets identified. In practice, the year in which COMMA took place was highly untypical. Even if it had not been overshadowed by the turbulence in the markets for crude, the mild winter combined with a high level of stocks to produce counter-cyclical movements at the margin, although the main flows of product reflected normal seasonal patterns.

ALL PRODUCTS - 1979

2.4 In 1979 West European inland deliveries of oil products amounted to nearly 613mn tonnes. Of this, 85 per cent, or 520mn tonnes was accounted for by the EEC countries, Sweden and Switzerland. These eleven countries also accounted for most of the international trade in products. Their gross total exports were 123mn tonnes or 91 per cent of that of all West European countries, and their gross total imports were 141mn tonnes or 88 per cent of the West European total. Both the eleven countries and total West Europe ran a small trade deficit on products of about 4 per cent of inland deliveries.

2.5 Production, foreign trade and inland deliveries of oil products in 1979 for the eleven countries are shown in Table A2.1. Among the countries listed, Federal Germany was the largest market, with inland consumption of 132mn tonnes. France, Italy and the UK were also major consumers with, respectively, 103,89 and 82mn tonnes. The markets in the other countries were smaller: the Netherlands, Sweden and Belgium were similarly placed consuming 25-30mn tonnes; Denmark and Switzerland took 15 and 12mn tonnes; Ireland 6mn tonnes and Luxembourg's inland deliveries were 1mn tonnes.

2.6 Although the distribution of production was broadly similar to inland demand, the differences were such to have a significant impact on the pattern of international trade. France, Germany, Italy and the UK were all major producers, but whereas France and the UK ran only small export surpluses, Italy was a net exporter of 15mn tonnes, and the FRG a net importer of 29mn tonnes. Italian gross exports amounted to 21 per cent of net production and gross imports were only 8 per cent of inland consumption, whereas Germany's gross exports were only 6 per cent of production and gross imports 27 per cent of consumption. The Netherlands was also a major exporter: gross product exports totalled 44mn tonnes (77 per cent of net production) and net of imports stood at 78mn tonnes. Belgium also exported a high proportion of its production. In contrast, Sweden, Switzerland and Denmark were major importers, each with gross imports greater than its net production, and net imports covering about a half of inland requirements.

2.7 Net foreign trade balances indicate which countries are short on product and which are long, the scale of international trade is measured by gross imports and exports. For example, the UK was roughly in balance and nonetheless was a major importer of product. Similarly, France was the third largest gross exporter among the countries considered. Of particular note, the Netherlands, which was West Europe's largest net exporter, was second only to the FRG in its volume of gross imports.

2.8 The greater part of the international product movements were local. Of the gross total imports at the eleven countries 56 per cent - 79 out of 141mn tonnes - originated from (other) EEC countries. Out of the gross total export volume of 123mn tonnes, 81mn tonnes or 66 per cent went to (other) EEC countries. There are some inconsistencies between volumes and trade recorded at export and the same trade flows recorded at import, but it can be estimated that about 85-90mn tonnes of product moved between the eleven countries in 1979.

2.9 Imports form third countries amounted to 50-55mn tonnes, of which the Netherlands imported 15 and Germany 12mn tonnes. Exports to third countries were about 35mn tonnes, of which Italy exported 12mn tonnes.

2.10 Supply analyses for mogas, naphtha, gasoil and fuel oil are shown in Tables A2.2 - A2.5. The pattern of trade for each of the products was broadly similar to that for all products, except that the eleven countries ran a small net export surplus on mogas and exhibited a marked foreign trade deficit on naphtha. The following paragraphs describe the structure of trade for each of the four products.

Mogas

2.11 In 1979 inland deliveries of mogas in the eleven countries were 88mn tonnes, or 17 per cent of deliveries of all products (Table A.2.2). The main markets were the FRG, France and the UK. Italy was also a sizeable consumer, although significantly smaller than the top three and mogas deliveries made up less than 14 per cent of all Italian products deliveries. Consumption in each of the other countries was under 4mn tonnes.

2.12 The eleven countries' total net exports of mogas were just under 6mn tonnes, or about 6 per cent of net production. The main exporters were Italy and the Netherlands, each with net surpluses of nearly 5mn tonnes. Belgium and France also ran export surpluses. The largest importer was Germany although, with net inflows supplying less than 10 per cent of German consumption, the import penetration was less that for all products (22 per cent). Swiss imports were also high; they accounted for 63 per cent of consumption.

2.13 A high proportion of the trade flows were local: 83 per cent of the gross total imports of the eleven countries (13mn tonnes) originated from (other) EEC countries. As examples: 43 per cent of German mogas imports came from the Netherlands and 37 per cent from other EEC countries; 47 per cent of UK imports were from Italy, 31 per cent from the Netherlands and 12 per cent from other EEC countries; 97 per cent of Swiss imports and 75 per cent of Swedish imports originated from EEC countries.

2.14 Gross mogas exports to third countries from the eleven were about 7mn tonnes. Italy exported nearly 3mn tonnes to non-EEC countries, notably the US, Greece and Austria. The Netherlands was also a substantial exporter to third countries, particularly in Africa.

Naphtha

2.15 The supply analysis for naphtha is shown in Table A2.3. Total inland deliveries in the eleven countries were 33mn tonnes, of which the Netherlands, FRG, France and Italy each consumed about 6mn tonnes. Net production amounted to only 24mn tonnes and placed the eleven countries in a severe trade deficit of 10mn tonnes, or 31 per cent of consumption.

2.16 Gross total naphtha exports from the eleven countries were 11mn tonnes, of which 90 per cent went to (other) EEC countries. Only Italy and Belgium ran a net export surplus, in both cases at about 16 per cent of net production. The Netherlands was at once, the largest gross exporter, gross importer, net importer and the largest importer from countries outside the EEC. The USSR supplied 30 per cent of Dutch third country imports and other East European countries supplied 23 per cent. In total, East Europe supplied over 5mn tonnes of naphtha to the eleven countries: 52 per cent of their net imports and 16 per cent of their consumption.

Gasoil

2.17 Table A2.4 shows the supply analysis for gas and diesel oil. Inland deliveries of these fractions amounted to 190mn tonnes or 37 per cent of total product deliveries, and with such weight in the total, the pattern of supply was similar to that for all products.

2.18 Gross total imports ran at over 49mn tonnes, gross exports at 40mn tonnes and the net deficit was about 10mn tonnes, or 5 per cent of total demand. Of the gross total export volume 67 per cent, 27mn tonnes, was shipped to (other) EEC countries.

2.19 The Netherlands was the largest exporter with over 16mn tonnes gross and over 9mn tonnes net. Most of its exports went to other EEC countries, notably the FRG (nearly 10mn tonnes). Italy and the UK were also substantial exporters, the latter mainly to other EEC countries, though a significant proportion of Italian exports went to Greece, Switzerland and Africa as well as to the EEC.

2.20 The largest importer of gas and diesel oil was Federal Germany, for which 18mn tonnes of net imports served to meet 29 per cent of inland demand. Second to the Netherlands, the largest supplier to Germany was the USSR. Although the absolute volumes were smaller, imports by Switzerland, Sweden and Denmark accounted for a large part of their national demand. In the case of Switzerland, imports were over 5mn tonnes (77 per cent of inland consumption) and originated mainly from the USSR, France and the Netherlands. Swedish imports amounted to 4mn tonnes, of which a quarter came from Venezuela.

Fuel Oil

2.21 In 1979 inland deliveries of fuel oil in the eleven countries amounted to 155mn tonnes (Table A2.5). International marine bunkers took a further 24mn tonnes. Net production was 174mn tonnes, leaving the countries with a net trade deficit of 7mn tonnes. The largest consumer was Italy with inland deliveries of 40mn tonnes. France and the UK each consumed about 28mn tonnes, the FRG 22mn tonnes and Sweden 11mn tonnes.

2.22 Gross total exports stood at 31mn tonnes of which 70 per cent went to (other) EEC countries. The Netherlands was the largest exporter (9mn tonnes gross, 4mn tonnes net), with the FRG, UK and Belgium each taking about 2mn tonnes. France, Belgium and Italy were also major net exporters, mainly to other EEC members, though in the case of Italy over 3mn tonnes went elsewhere, notably to Turkey, the US and Africa.

2.23 The most significant importer was Sweden. Nearly a third of the 7mn tonnes imported came from the USSR, and a third came from EEC countries. Denmark and Germany were each net importers of 2-3mn tonnes, and each received a high proportion of their supplies from the Netherlands.

VARIATIONS IN DEMAND DURING THE COMMA YEAR

2.24 Table A2.6 shows inland deliveries for all products quarterly for nine countries during the course of the COMMA exercise. The data are expressed both in millions of tonnes delivered during the quarter and as indices based on average quarterly deliveries during the period.

2.25 For the group of nine countries deliveries ranged from a trough, 10 per cent below average in the first COMMA quarter, to a peak, 8 per cent above average in the third COMMA quarter, and falling back in the fourth. All countries peaked in the third COMMA quarter except Federal Germany, the UK and Irish Republic which peaked in the second. The strongest cyclical movement occurred in Denmark where demand was 23 per cent below average in the first COMMA quarter and 20 per cent above in the third. France, Italy and Belgium also displayed strong cyclical movements.

2.26 Mogas deliveries exhibited a cyclical peak in the first COMMA quarter and a trough in the third (Table A2.7). At the peak, demand was 7 per cent above average, and at the trough, 8 per cent below. Individual countries followed a similar pattern, though the fluctuation was more violent in Sweden and relatively moderate in the Netherlands.

2.27 Gas and diesel oil deliveries displayed a strong cycle everywhere except Federal Germany (Table A2.8). For the nine countries, inland consumption ranged from 20 per cent below average in the first COMMA quarter to 20 per cent above in the third. This pattern is heavily damped by the FRG which held a 35 per cent share of the demand in the nine countries: demand in the other eight countries varied from 32 per cent below average in the first COMMA quarter to 31 per cent above in the third.

2.28 Among the nine countries, fuel oil deliveries were at their lowest in the first COMMA quarter (16 per cent below average) and at their highest in the third quarter (12 per cent above average - Table A2.9). The amplitude of this cycle was less in the FRG and Ireland, and greater in France and Denmark. The pattern in Sweden was unique, with declining deliveries throughout the COMMA year.

SPOT TRADE AND THE MAINSTREAM

2.29 The spot trade takes place within the framework described above. The volumes are included in the figures for inland demand and international trade but are completely swamped by the much larger volumes of inter-affiliate and term trade that comprise it. Volumetrically, spot transactions are only a thread in the complex pattern woven from the many long-term relationships that go to make up the mainstream of the industry, but it cannot be identified from the published data. Only in COMMA has the trade been explicitly recorded and there the record is incomplete. The operations of the market as a whole, therefore, do not provide information about the volumes of the spot trade embedded in it. But as the context of the spot trade, they contribute to an understanding of the influences affecting it.

Chapter Three

THE COMMA TRADE: VOLUMES AND STRUCTURE

Introduction

3.1 Of the information registered in the course of the COMMA exercise, the most important - because not available in any other way - concerns volumes. All companies engaged in the trade have ideas and make their estimates about different elements of market structure: the size of the market, shares of different products and the finer structure of quality. But until COMMA, and Checkrun before it, there was no hard information. Chapters three and four examine the volume information registered under COMMA with the intention of providing answers to these questions. The answers are necessarily incomplete, and in some cases misleading, because the sample base of COMMA participants does not comprise a complete set of companies engaged in the European spot trade; moreover, for some products it was not representative, since important specialist traders did not participate. In spite of these reservations the COMMA data provide an irreplaceably important information about the operations of the spot market.

3.2 Participants registered transactions with the auditors, who then examined the reports in the light of the reporting rules to exclude transactions that did not conform, for example: wrong size package, out of time, wrong location. Some of these "valid transactions" were then further excluded because prices were set in relation to a price reference (see "quotations-linking" chapter five). The remaining transactions were put through the statistical programme and served as the basis for the weekly price reports. Of the different types of volume information available, the total valid transactions data (including quotations-linked and late reported transactions) provide the best basis for making comparisons over time and between product categories. Tables A.3.1-4 give volumes and numbers of transactions, quarterly and by reporting area for totals reported to the auditors and valid transactions. It will be seen that 5mn tons (10 per cent) of the total registrations were excluded - a fairly random collection of transactions that would blur necessary distinctions.

COMMA Totals

3.3 COMMA transactions for all products are shown, quarterly and by reporting area, in Table 3.1 overleaf. Total valid transactions in the COMMA year came to 43.2mn tons. The trade started slowly and in the first quarter was 17 per cent below the quarterly average for the year, rising rapidly to 12 per cent above. This was probably the result of start-up problems as the number of participants built up and the companies learned familiarity with the reporting procedure: in June and July of 1979 the rate of reporting was 75 per cent of the annual average.

TABLE 3.1

TOTAL COMMA TRADE*, QUARTERLY BY AREA

(million tonnes)

	June-Aug	Sept-Nov	Dec-Feb	Mar-May	June-May
NWE CARGOES	3.8	5.5	4.2	4.3	17.8
NWE BARGES	2.5	3.5	3.5	3.6	13.1
NWE TOTAL	6.3	9.0	7.7	7.9	30.9
MED FOB	1.6	1.5	0.9	0.7	4.7
MED CIF	1.1	1.6	2.8	2.1	7.6
MED TOTAL	2.7	3.1	3.7	2.8	12.2
GRAND TOTAL	9.0	12.1	11.4	10.7	43.2

*Valid transactions, including quotations-linking

3.4 The reports were split between Northwest Europe and the Mediterranean roughly 5:2 and the development of trade was different in the two areas. Volumes of trade in the areas started low, for reasons given above, and both sharply increased in the second COMMA quarter; thereafter, they declined. Within the area reports, however there were differences: between cargoes and barges in the NWE reports and FOB (export) and CIF (import) trades in the Med. The cargo trade (58 per cent of the NWE total) rose sharply, by nearly a half, in the second COMMA quarter and then dropped back to just below the quarterly average; barge volumes rose though the four quarters. The Med differences were even more marked. The CIF trade, which accounted for 39 per cent of the Med total, declined through the exercise, to less than a half of the starting level; the FOB trade rose to a peak in the third COMMA quarter and ended at about twice its starting level. These differences are highlighted in Table 3.2 overleaf, which shows quarterly trade totals as an index, with the average for the year as 100.

TABLE 3.2

COMMA TRADE INDICES
(Annual Quarterly Average = 100)

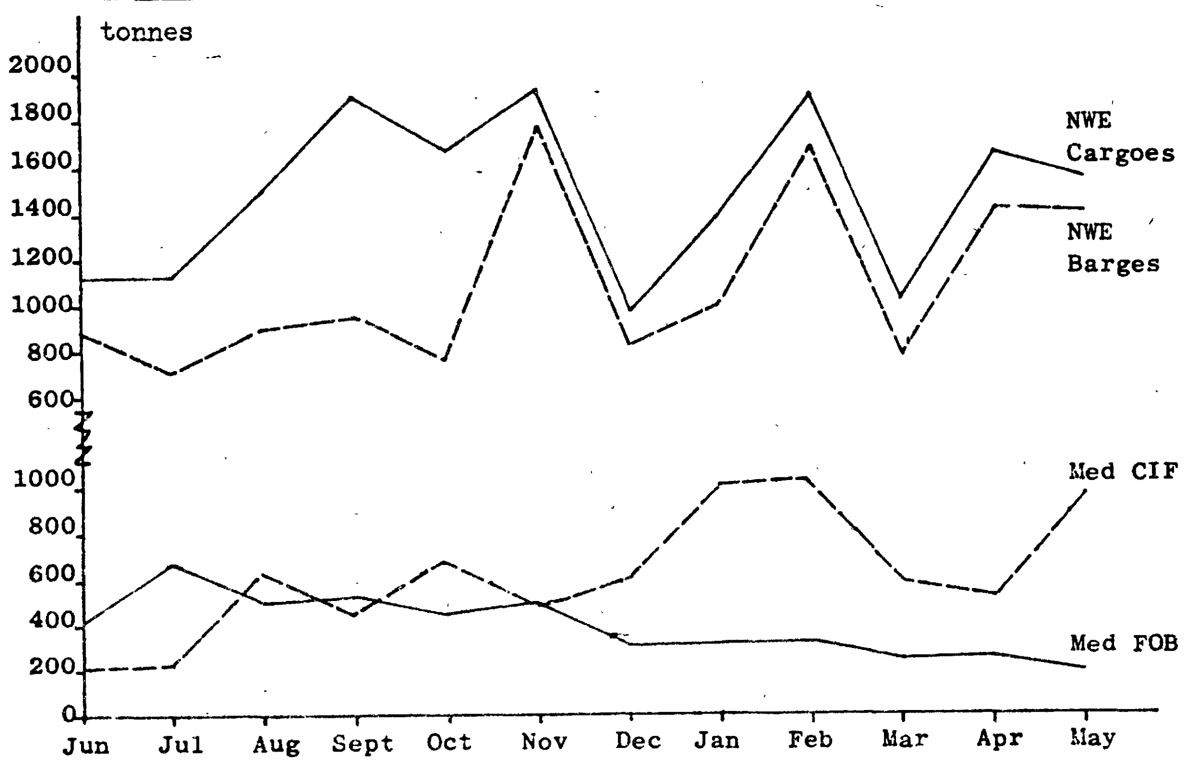
	June-Aug	Sept-Nov	Dec-Feb	Mar-May	June-May
NWE CARGOES	85	124	94	97	400
NWE BARGES	76	106	106	110	400
NWE TOTAL	82	117	100	102	400
MED FOB	136	128	77	60	400
MED CIF	58	84	147	111	400
MED TOTAL	89	102	121	92	400
GRAND TOTAL	83	112	106	99	400
EUROPEAN INLAND DEMAND					
NINE COUNTRIES	90	104	108	98	400

It will be seen that overall demand follows the shape of European inland demand in pattern, although not in magnitude, but that individual markets diverge from it quite significantly. These differences are only explainable at the aggregated level for the Med (Italian) trade, where exports decreased and imports increased as the relative attractiveness of the Italian domestic market changed. For the swings in the NWE markets, it will be necessary to look at developments in markets for individual products.

3.5 There is an element of randomness in the development of trade volumes which is smoothed out in the quarterly aggregates, but is apparent from an inspection of monthly trade. Table A.3.5 gives COMMA trade for all products by month, by reporting area, and shows considerable fluctuation around the trend line. The movements were not uniform, with two exceptions: the decline in trade either side of Christmas; and the general slowdown in the spot trade that occurred in March, in which all the markets shared. This random movement, which is even more marked by week-by-week development, is characteristic of the spot trade: a marginal trade existing on the fringes of much larger systems of supply and demand.

CHART 3.1

COMMA TRADE BY MONTH : ALL PRODUCTS



European Spot Trade

3.6 Estimating the spot market presents difficulties, because it is such a diffused activity and nowhere is it recorded. A small part of the total trade, spot transactions are embedded in much larger flows and are not in any useful way to be statistically distinguished from them. The industry uses rules of thumb that are no more than rough indications: 5 per cent of the total trade has been widely accepted as roughly correct, implying some 25mn tons throughput for the nine countries discussed in the previous chapter. The Checkrun Report included an estimate based on Checkrun results which concluded that the net trade through the NWE spot market in that year (1978) would have been about 30mn tons.

3.7 As a voluntary register, COMMA does not provide a complete account of the trade, although it is more nearly complete than Checkrun, and it may be assumed that it captured a major part of the total. An estimate of the whole market would be, in effect, an estimate of unregistered trade - which is to say, imports by unregistered traders, trade between them and sales to end-users. Any trade involving participants would have been registered under COMMA. A rough idea of relative activity in the market can be gained by comparing COMMA and Checkrun figures. The two exercises ran through the months June-August, in 1978 and 1979, and the volumes were similar.

(Mn tonnes)	NWE Cargoes	NWE Barges	TOTAL
COMMA	2.6	2.4	5.0
Checkrun	2.4	2.7	5.1

(Volumes underlying price reports)

This suggests, in fact, that the net trade through the market was less in the months compared for COMMA than for Checkrun, for two reasons: the reporting base for COMMA was larger, and included important traders not in the Checkrun; and the velocity of circulation was higher. This last point perhaps needs some amplification. The volumes registered in the two exercises are a measure of market activity. Since some parcels will have been traded more than once on their way through the market, it will always be more than the net trade (treating the market as a black box, with only inputs and outputs). The link between the two is the velocity of circulation. If all parcels are traded twice, the net trade is half the market activity; if three times, it is a third. When the market is busy and margins are high, a small amount of product can circulate with great rapidity; in more stable times, the velocity may drop back towards unity. During the COMMA exercise, although there were flat periods, the velocity was generally considered to have been higher than during the Checkrun. The combination of the two factors (level of participation and velocity) suggests that net volumes through the NWE market were well below those in 1978.

3.8 A number of companies were asked for their opinions on the size of the spot market. Most replied, as they had when asked the same question during the Checkrun, that they had no usable estimates. In discussion, however, the following line of reasoning emerged. The NWE registrations for COMMA were 31mn tonnes. From consideration of the major non-participants, a guess was made at unregistered trade of 10mn tons, giving a total activity of 40mn tonnes - about the same as for the most conservative Checkrun estimate. (The highest estimate was 60mn tonnes.) One company estimated the velocities of circulation for the different products below:

	Cargoes	Barges
Mogas	1½	1½
Naphtha	1	2
Gasoil	2	4
1% Fuel Oil	1	1
3.5% Fuel Oil	1¾	2

Weighted and applied to the above estimate, this gives a net spot trade of 20mn tonnes. It would have been surprising if spot volumes had not been down from 1978.

i. The market was short and product not available.

ii. Companies with product and with a downstream need tended to balance through exchanges, rather than buying and selling, to maintain volumes.

The extreme volatility of prices is consistent with a thin but active market.

Market Structure

3.9 Overall COMMA trade by product in the four reporting areas is summarised in table 3.3. It will be seen that the spot trade is not evenly spread across the products: the three most important accounted for more than three-quarters of the total and the first four for nearly 90 per cent. These shares do not correspond to the product shares of inland demand, thus:

	COMMA share	Inland Deliveries Share
Mogas	8%	18%
Gasoil	38%	35%*
Heavy Fuel Oil	38%	28%

*Including diesel oil

The differences highlight the different natures of the main and spot markets, and in particular the technical and market constraints that shape the spot trade.

i. The downstream of the industry is heavily committed to gasoline retailing. The size of the independent sector, the amount available for trading at the margin and the technical properties of the product all combine to restrict the spot trade in this product.

Annex I

TABLE 3.3

SUMMARY OF TOTAL OF COMMA VOLUMES AND NUMBERS OF TRANSACTIONS REPORTED FOR FOUR REPORTING REGIONS.

	NWE			MED			Grand Total
	Cargo	Barges	Total	FOB	CIF	Total	
PREMIUM MOGAS							
MT '000	1142	977	2119	745	95	840	2959
No	94	452	546	44	6	50	596
REGULAR MOGAS							
MT '000	191	244	435	170	0	170	605
No	27	137	164	12	0	12	176
NAPHTHA							
MT '000	4674	921	5595	340	938	1278	6873
No	261	141	402	19	48	67	469
GASOIL							
MT '000	4398	8041	12439	1387	2398	3785	16224
No	304	4746	5050	93	112	205	5255
MAX. 0.5% FUEL OIL							
MT '000				125	0	125	125
No				7	0	7	7
MAX. 1% FUEL OIL							
MT '000	2682	1450	4132	398	166	564	4696
No	130	460	590	21	6	27	617
MAX. 2% FUEL OIL							
MT '000	746	655	1401	189	198	387	1788
No	31	231	262	8	5	13	275
MAX. 3.5% FUEL OIL							
MT '000	3938	862	4800	1330	3766	5096	9896
No	179	233	412	61	118	179	591
TOTAL FUEL OILS							
MT '000	7366	2967	10333	2042	4130	6172	16505
No	340	924	1264	97	129	226	1490
GRAND TOTAL							
MT '000	17771	13150	30921	4684	7561	12245	43166
No	1026	6400	7426	265	295	560	7986

TABLE 3.4

SUMMARY OF COMMA TRADE: PRODUCT SHARES

(Percentage of trade reported for each area)

	NWE		MED		
	Cargoes	Barges	FOB	CIF	TOTAL
Premium Mogas	6	7	16	1	7
Regular	1	2	4	0	1
Naphtha	26	7	7	12	16
Gasoil	25	61	30	32	38
Max 0.5% Fuel Oil	-	-	3	0	0
Max 1% Fuel Oil	15	11	9	2	11
Max 2% Fuel Oil	4	5	4	3	4
Max 3.5% Fuel Oil	22	7	28	50	23
All Fuel Oils	41	23	44	55	38
TOTAL	100	100	100	100	100

ii. Gasoil is an opposite case, since there is a large independent sector dealing in home heating oil and the product is easy to store and handle. It is the most important single product in the spot trade.

iii. The status of fuel oil in the spot trade appears to be changing. It is an industrial product and would naturally, therefore, be a subject for term trade. But the volumes traded spot is increasing: the fuel oil share of Checkrun registrations was 18 per cent, compared with COMMA's 33 per cent. The reporting sample would have accounted for some, but not all, of the increase.

Naphtha would be interesting to set in context, but problems of definition make it difficult to make a comparison with inland demand. Basically, it is an import market, reflecting the balancing qualities brought in from outside sources: naphtha imports accounted for one-third of European consumption in 1979.

Regional Differences

3.10 Cargoes: The aggregates considered above conceal important differences between the reporting areas. (See Table 3.4 and A.3.1-4). Volumetrically, NWE cargoes were dominant, accounting for 40 per cent of volumes registered (13 per cent of numbers). Trade was highly concentrated: three products accounted for 92 per cent of the total. The most important product was fuel oil, which accounted for 41 per cent and was divided about 2:3 between 1% and 3.5% grades. Without more information about the status of the transactions registered (specifically CIF/FOB), it is not possible to draw conclusions about the nature of this trade. 1% grades are traditionally Scandanavian, but there is an increasing trade of the low-sulphur grades up the Rhine, which may have been for blending to German specifications; barge volumes for this product were 54 per cent of cargo levels, so that no conclusions can be drawn about the direction of trade. It had been decided to include an extra grade of fuel oil, maximum 2%, to map the territory between the most-traded grades and to try and pick up a trade that was presumed to exist for 1.8%. In the event, the number of registrations for this grade was low. The next two important products were gasoil and naphtha, with a quarter each. This was a marked swing from the shares of the cargo trade reported in the Checkrun: 30 per cent for gasoil and 23 per cent for naphtha. The most notable feature of the cargo trade is seen in its contrast with the barge market; although a market in which traders are active (see chapter 5) it is predominantly a source of supply to refiners and other industrial end-users, and the structure of trade reflects this.

3.11 Barges: The barge market is strikingly different, mainly because it is dominated by the requirements of the German, and to a lesser extent Swiss, markets. Although the ability of German independent traders to supply their markets from outside purchases changed during the COMMA year, as Rotterdam prices rose above German inland prices, they remained a far more important factor than in other markets proportionately and, given the size of the German market, the absolute amounts required dominated the rest. Thus, the barge market is a market for gasoil above all because of the structure of the German domestic market, in which independent traders occupy an important part of the market for home heating oil. The share of gasoil in COMMA (61 per cent) was the same as in the Checkrun, in spite of the changes in the oil market generally, and this reflects the underlying structure of the market. The fuel oil share was slightly greater - 23 per cent compared with 20 per cent - although not by enough to signal a change. Of the other products, naphtha showed the largest increase, from 2 per cent to 7 per cent, and premium mogas showed a corresponding decrease, from 16 per cent to 7 per cent - reflecting the difficulties of getting material and supplying it to inland markets at a profit.

3.12 Med: The main features of the Mediterranean markets have already been touched upon:

i. Changes in government policy that made Italy an attractive import market for gasoil at the turn of the year.

ii. Demand for straightrun fuel oil for cracking, as spot prices of crude oil rose.

Both CIF and FOB markets were thinly reported, but the main differences between them were the much larger share of premium mogas in exports (16 per cent) than in imports (1 per cent), and the greater share of fuel oil - particularly of 3.5% - exports (55 per cent) compared with imports (44 per cent). Low sulphur grades were reported separately, and a 0.5% category was introduced to pick up trade to the US East Coast; this accounted for only a small part (6 per cent) of the FOB fuel oil trade and nothing in the CIF trade. Because of reservations about the completeness of the COMMA sample for Med reports and the basis on which traders lift products from Mediterranean refineries (ie how much of the spot trade is, in fact, reportable as such under the COMMA rules), it is not possible to draw firm conclusions about the structure of FOB trade. The development of both FOB and CIF volumes is, however, directionally consistent with other information on the market.

Seasonal Changes

3.13 There are normally well-marked changes in the pattern of demand between seasons: Summer is the mogas season; Winter is the heating (gasoil and fuel oil) season. The seasons are defined by consumption, but deliveries tend to anticipate them, as stocks are built and drawn down. Most important is the interaction between the level of consumption, determined by the unpredictable seasons, and the attempts made by the industry to anticipate it on the basis of past experience. Thus, stocks built in anticipation of a normal season's heating load would be too much in in a mild winter; the direct effects on consumption would be exaggerated by the effects of running stocks down; this happened in 1979/80 when stocks were, in any case, abnormally high.

3.14 Tables A.2.7-9 show inland deliveries for mogas, gasoil and heavy fuel oil in 9 European countries, also expressed as indices of the quarterly average for the year. It shows marked seasonal movements. The totals are given for three products below, to act as a standard of comparison for indices of NWE cargoe and barge trades. Med volumes are given as well but are anomalous since other developments in the market obscured seasonal fluctuations, specifically: the marked and consistent decrease in exports and increase in imports. All volumes are expressed as a percentage of quarterly averages for the year.

3.15 Mogas

TABLE 3.5

QUARTERLY TRADE AS INDICES (ANNUAL AVERAGE = 100)

	June/Aug	Sept/Nov	Dec/Feb	Mar/May
9 Countries (1)	107	101	92	100
NWE Cargoes (2)	110	136	100	53
NWE Barges (2)	106	116	72	105
MED FOB (2)	86	94	116	104
MED CIF (2)	128	64	144	64

1. All mogas, inland deliveries

2. Premium Mogas, COMMA trade

Inland deliveries showed the expected seasonal pattern, dropping to a trough in winter and recovering thereafter. Spot demand for both cargoes and barges, however, peaked in the second COMMA quarter, probably in response to late demand from the USA. Thereafter cargoes declined to their lowest level in the exercise: refiners' stocks were full and prices high, and in May there was virtually no trade. The barge trade showed signs of recovery for the mogas season.

3.16 Gasoil

TABLE 3.6

QUARTERLY TRADE AS INDICES (ANNUAL AVERAGE = 100)

	June/Aug	Sept/Nov	Dec/Feb	Mar/May
9 Countries (1)	80	103	120	97
NWE Cargoes (2)	74	128	104	94
NWE Barges (2)	78	114	98	110
MED FOB (2)	132	136	82	51
MED CIF (2)	64	105	160	71

1. Inland deliveries of gasoil and diesel oil

2. Gasoil, COMMA trade

Seasonal developments in the spot market for gasoil were closer to the norm. In spite of a mild winter, inland deliveries showed the expected pattern. Cargo trade peaked in the second COMMA quarter, as product was brought in for the beginning of the heating season; the barge trade also peaked in the second quarter. Both trades dropped sharply in the third quarter in the face of the combined effects of a mild winter and full stock. Cargoes continued to drop even more sharply, but there was a late demand for gasoil inland, partly by the barge trade drawing from refinery and independent stocks in Rotterdam.

3.17 Fuel Oil

TABLE 3.7

QUARTERLY TRADE AS INDICES (ANNUAL AVERAGE = 100)

	June/Aug	Sept/Nov	Dec/Feb	Mar/May
9 Countries (1)	84	108	112	96
NWE Cargoes (2)	90	127	95	88
NWE Barges (2)	72	98	144	87
MED FOB (2)	159	124	65	52
MED CIF (2)	44	58	146	153

1. Inland deliveries

2. COMMA trade of all fuel oil grades

Both the cargo and barge trades conformed to the expected seasonal pattern, although with peaks that were not distributed through the heating season.

3.18 It is apparent from an examination of the volumes traded that the spot trade, while generally moving along the trend line of trade as a hhole, fluctuated widely either side of it in response to shifts in the balance of supply and demand. In this, the role of stocks was crucial. Most companies engaged in oil industry built up their stocks as much as possible through 1979, to a point where there was not much flexibility available. The mild winter did not provide the opportunity to draw stocks down, and by the end of the heating season prices were falling. These influences only exagerrated pressures on the spot market, and volumes moved sharply in response: the fuel oil barge trade dropped by 40 per cent between the third and fourth COMMA quarters; premium mogas cargoes dropped 47 per cent over the same period, while barge volumes increased by 46 er cent. These sharp movements are characteristic of a marginal market.

Chapter Four

QUALITY SPECIFICATIONS OF PRODUCTS TRADED IN THE SPOT MARKET

A Structural Analysis of Quality

4.1 Among the transaction details reported by COMMA participants was information on the quality specifications of product traded. Quality is one of the determinants of price and the quality distribution of volumes traded is a relevant feature of the market. This chapter describes the quality distributions of valid COMMA transactions.

4.2 Before the COMMA exercise, no information on the qualities of the spot trade in oil products was available. Knowledge has rested on the experience of participants in the market: it is used implicitly as one of the determinants of quality markers and of actual and published price markers. The results of the COMMA quality analysis have been compared with the experience of the trade to identify discrepancies and to suggest where they are caused by a systematic bias in the COMMA reporting base, such as the omission of key traders in certain grades.

4.3 The quality breakdown of COMMA trade is set out by product in the sections below. For each product and reporting region, the total volume of valid trade was analysed according to the volumes traded in each of the main grades. This identified grades which were heavily traded and those in which there was little or no activity. Where possible, an indication of the factors influencing the distribution is provided. These fall under the following headings:

i. <u>Supply Constraints</u>; eg different crudes tend to yield products of particular specifications such as a specific gravity range.

ii. <u>Market Constraints</u>; eg certain specifications, the quality markers, serve a wide demand.

iii. <u>Legal Constraints</u>; eg grades are tailored to meet lead and sulphur requirements,

iv. <u>Technology Constraints</u>; eg the feasibility of operations such as blending and desulphurizing influence both supply and demand for particular grades.

PREMIUM MOGAS: Lead Content and Specific Gravity

Sample Base

4.4 Since the quality distribution analysis divides up the sample of valid COMMA transactions into groups of transactions of product with similar specifications, the significance of the results is highly dependent on the size of the sample and on whether it is representative of the trade. A large sample which includes the main traders and a selection of specialist traders yeilds more significant results than a small one which excludes important traders. The omission of a few specialist traders could completely distort the reporting of trade in particular grades and at the extreme, a poorly based sample can only yield impressionistic results.

4.5 The COMMA samples from the NWE cargo and barge trades in premium mogas appear to be well-based. They are large, each of about 1mn tonnes and with 94 valid cargo transactions and 452 barge transactions. Some specialist traders are omitted, and this may have affected the results for the qualities reported. The sample for the Med FOB trade in premium mogas is also of a significant size (0.7mn tonnes, 44 valid transactions), but for the Med CIF trade the sample is too small to be useful (0.1mn tonnes, 6 valid transactions).

4.6 Sample sizes are further reduced by the exclusion of valid transactions for which quality data are not available. For premium mogas, qualitities are well reported. About 10 per cent by weight of each quality-sample did not report, although for NWE barges, 22 per cent did not report specific gravity.

Lead Content

4.7 The percentage breakdowns by weight for lead content in premium mogas are shown in Table 4.1 for the three reporting regions of significant sample size. More detailed breakdowns, including that for Med CIF trade, are presented in Tables A.4.1-A.4.4. It should be noted that the lead content ranges include the lower limit and exclude the upper: 0.4 g/l mogas is found in the range 0.40-0.45 g/l which probably means that the range includes material to a "max. 0.4" specification.

TABLE 4.1

PREMIUM MOGAS: SUMMARY OF QUALITY SORTING BY LEAD CONTENT FOR THREE REPORTING REGIONS

Per cent of total valid transactions by weight in reporting region

LEAD CONTENT g/l		REPORTING REGION		
		NWE		MED
FROM	TO LESS THAN	Cargoes	Barges	fob
0.45	and above	26	4	12
0.40	0.45	44	24	78
0.20	0.40	2	2	0
0.15	0.20	16	59	3
Less than	0.15	2	2	0
Not reported		11	9	6
TOTAL		100	100	100

Source: Tables A.4.1, A.4.2 and A.4.4

4.8 Table 4.1 shows that there was little or no premium mogas traded in any of the reporting regions with lead content below 0.15 g/l and from 0.2 g/l to less than 0.4 g/l. For NWE cargoes, 44 per cent by weight of valid transactions had a lead content of 0.4 g/l to less than 0.45 g/l; for reasons suggested below, most of this material was probably of 0.4 g/l lead. There was also cargo trade in premium mogas with 0.45 g/l lead and above (26 per cent) and from 0.15 g/l to less than 0.20 g/l lead (16 per cent). The Med FOB trade showed a similar pattern, with a sharp peak at 0.4 g/l to less than 0.45 g/l lead (78 per cent), some activity at 0.45 g/l and above (12 per cent) and little in other grades. In contrast the peak activity in NWE barges was in the range 0.15 g/l to less than 0.2 g/l lead (59 per cent); with some from 0.4 g/l to less than 0.45 g/l (24 per cent) and little in other grades.

4.9 The distribution of trade by lead content is strongly influenced by national regulations in Europe concerning the maximum allowable levels of lead. Most countries proscribe levels above 0.4 g/l in premium mogas, the UK and Belgium do not permit more than 0.45 g/l, and in France the limit is 0.5 g/l. Standing apart is Federal Germany, where the maximum allowable lead content is 0.15 g/l. The regulations are summarized, together with those for regular mogas, in Table 4.2.

TABLE 4.2

MAXIMUM PERMITTED LEAD LEVELS FOR PREMIUM AND REGULAR MOGAS IN THE MAIN WEST EUROPEAN COUNTRIES

g/l

	Premium	Regular
Federal Republic of Germany	0.15	0.15
Sweden	0.40	0.15
Switzerland	0.40	0.15
Netherlands	0.40	0.40
Denmark	0.40	0.40
United Kingdom	0.45	0.45
Belgium	0.45	0.45
France	0.50	0.50

4.10 Since it is cheaper to produce mogas of a given octane number using a high, rather than low, level of lead, the content is generally tailored to lie on or just below the maximum allowed. The distribution of trade accordingly gravitates closely towards the limits in different countries. No major European country sets a limit between 0.15 g/l and 0.4 g/l or below 0.15 g/l and there was little trade in these grades. What trade there was may have been of mogas which was later blended to a different octane or lead specification. In contrast, all three reporting regions displayed strong activity in lead content from 0.4 g/l to less than 0.45 g/l. Most of this was probably 0.4 g/l lead, the most common allowable limit in Europe.

4.11 The foregoing argument is heightened by differences between the three reporting regions. NWE barges show a sharp peak from 0.15 g/l to less than 0.20 g/l lead, influenced by the German requirement for 0.15 g/l material. The barge trade in 0.4 g/l premium mogas probably relates to the Swiss and Dutch markets. In contrast, most cargo trade was at 0.4 g/l serving Sweden, the Netherlands and Denmark, and at 0.45 g/l and above serving the UK and France. Cargo trade in 0.15 g/l material was probably 'through trade' to barges to serve the German market. There was little Med FOB trade in grades below 0.4 g/l, which accords with the fact that there are virtually no Italian exports of mogas to Germany.

Specific Gravity

4.12 Table 4.3 shows the percentage breakdown by weight for specific gravity. The data are shown in more detail in Tables A.4.1-A.4.4. There are no distinct peaks or troughs in the distributions for any of the reporting areas. Most of the trading was in premium mogas of gravity 0.740 to less than 0.765. For NWE cargoes and Med FOB, specific gravities are distributed approximately normally about a mode in the range 0.750-0.755. The distribution for NWE barges is skewed, with the mode in the range 0.760-0.765 but with the greater part of trading in product with specific gravity less than 0.760. Since there was a high incidence of non-reporting of specific gravity for NWE barges, the skew distribution can only be regarded as impressionistic. The distributions for all three reporting regions are best considered random and predominantly in the range 0.740-0.765.

TABLE 4.3

PREMIUM MOGAS: SUMMARY OF QUALITY SORTING BY SPECIFIC GRAVITY FOR THREE REPORTING REGIONS

Per cent of total valid transactions by weight in reporting region

SPECIFIC GRAVITY		REPORTING REGION		
		NWE		MED
FROM	TO LESS THAN	Cargoes	Barges	fob
0.760 and above		25	39	9
0.750	0.760	37	17	54
0.740	0.750	21	21	30
less than	0.740	4	1	4
Not reported		12	22	3
TOTAL		100	100	100

Source: Tables A.4.1, A.4.2 and A.4.4

4.13 Specific gravity is a determinant of the price of premium mogas, since the industry trades it by weight but the ultimate consumer buys it by volume. The relationship between specific gravity and price is discussed elsewhere in this report. Concerning the structure of the market, specific gravity is of less importance. Some countries hold a preference (one trader suggested that Switzerland has a lower specific gravity requirement), but it is not a legal or technological constraint on demand. This is why, in contrast to lead content, there are no sharp peaks and troughs or differences between reporting regions in the distributions of specific gravity.

4.14 Specific gravity is influenced by market and technological features of supply. It varies with the crude slate used to produce the premium mogas, it is related to the lead content of the product and also on whether it has been blended with a different premium mogas or with virgin naphtha. Such factors create a plethora of possibilities and indicate why, in aggregate, the specific gravity of the COMMA trade varied randomly within a range.

REGULAR MOGAS: Lead Content and Specific Gravity

Sample Base

4.15 The COMMA samples for regular mogas are smaller than those for premium. Valid cargo and barge trade each amounted to about 0.2mn tonnes with 27 cargo transactions and 137 in barges. There were 12 valid Med FOB transactions (0.2mn tonnes) and none for Med CIF. As with premium, some specialist traders were omitted from the samples.

4.16 Qualities were well reported for NWE barges and Med FOB: less than 13 per cent by weight of each quality-sample failed to report. NWE cargo qualities were poorly reported with no informationon 38 per cent for lead content and 33 per cent for specific gravity.

4.17 With a large number of transactions and a high quality reporting rate the sample for NWE barges is of significance. The samples for NWE cargoes and Med FOB are not well-based and are analysed below only for indicative interest.

Lead Content

4.18 The lead content distributions for regular mogas are shown in Tables A.4.5-A.4.7 and summarized in Table 4.4. They are similar to those for premium mogas. There is a marked peak in the barge trade at 0.15 g/l lead (note the definition of ranges described above) and also some trade at 0.4 g/l, but little at other lead levels. Although a poor sample, the data for cargoes do suggest that there was little trade in regular mogas at lead levels from 0.2 g/l to less than 0.4 g/l or at below 0.15 g/l. It is also likely that there was little fob trade in the Med at levels below 0.4 g/l.

TABLE 4.4

REGULAR MOGAS: SUMMARY OF QUALITY SORTING BY LEAD CONTENT FOR THREE REPORTING REGIONS

Per cent of total valid transactions by weight of reporting region

LEAD CONTENT g/1		REPORTING REGION		
		NWE		MED
From to	Less than	Cargoes(a)	Barges	fob(a)
0.45 and above		13	1	75
0.40	0.45	18	14	12
0.20	0.40	0	2	2
0.15	0.20	31	80	0
Less than	0.15	0	1	0
Not Reported		38	2	11
TOTAL		100	100	100

a) Poorly based samples, see text

Source: Table A.4.5, A.4.6 and A.4.7

4.19 Lead regulations on regular mogas are similar to those on premium mogas (see table 4.2), the main exceptions are Sweden and Switzerland where the limits are 0.15 g/l on regular and 0.4 g/l on premium. The alignment of Swiss and German regulations at the lower maximum permitted lead level suggests why the 0.15 g/l peak in the mogas barge trade is more marked for regular than for premium. The relatively small volume of barge trade in regular mogas with a lead level of 0.4 g/l was probably serving the Dutch market. Such evidence as there is on regular mogas cargo trade indicates the mode of activity in 0.15 g/l lead instead of 0.4 g/l as observed for premium. This is consistent with the tighter regulations on regular mogas in Sweden and, for through trade to barges, in Switzerland.

Specific Gravity

4.20 Table 4.5 summarizes the distributions of trade by specific gravity. The range of gravities is slightly lower than in the case of premium mogas: for barges the bulk of trade lies in the range 0.735-0.755. There are peaks and troughs in the distributions (see Tables A.4.5-A.4.7), but they do not follow a distinct pattern and are probably the random result of small samples.

TABLE 4.5

REGULAR MOGAS: SUMMARY OF QUALITY SORTING BY SPECIFIC GRAVITY FOR THREE REPORTING REGIONS

Per cent of total valid transactions by weight in reporting region

SPECIFIC GRAVITY		REPORTING REGION		
		NWE		MED
From	to less than	Cargoes[a]	Barges	Fob[a]
0.760	and above	21	0	11
0.750	0.760	11	14	9
0.740	0.750	11	28	44
less than	0.740	24	45	36
Not Reported		33	13	0
TOTAL		100	100	100

a) Poorly based samples, see text

Source: Tables A.4.5, A.4.6 and A.4.7

4.21 As with premium, the specific gravity of regular mogas is a determinant of price, but is itself mainly determined by market and technological features of supply, such as the crude slate used. These combine to allow a range of possible specific gravities. Since the octane number range of regular is lower than that of premium, constraints on blending and lead content create a slightly different feasible range of gravities for the two products.

NAPHTHA: Paraffinic Content

Sample Base

4.22 The naphtha reports provided samples which are among the best in the COMMA exercise. For NWE they are large, with 261 valid cargo transactions (4.7mn tonnes) and 141 valid barge transactions (0.9mn tonnes). The Med CIF trade is well covered (48 transactions, 0.9mn tonnes), although the FOB trade sample is smaller (19 transactions, just over 0.3mn tonnes). There are few significant naphtha traders omitted from the samples, which include the main petrochemical companies. Qualities are well reported for the Med (about 10 per cent failed to report in each trade) and, given the large samples, are acceptable for NWE (18 per cent did not report for cargoes and 24 per cent for barges). Of the reporting regions, only the Med FOB sample is notable as being possibly poorly based.

Paraffinic Content

4.23 The distributions by paraffinic content are summarized in Table 4.6. The main feature is the similarity in the pattern for the four reporting regions. In each, most of the trade was of naphtha with a paraffinic content lying between 65 per cent and 80 per cent, and there was no valid trade in naphtha of less than 50 per cent paraffinic content (see table A.4.8). The mode of each distribution is at about 70 per cent, though it is slightly higher for Med FOB, possibly due to the poor base of this sample. Trade was distributed approximately normally about the mode, suggesting a random spread of qualities at the aggregate level.

TABLE 4.6

NAPHTHA: SUMMARY OF QUALITY SORTING BY PARAFFINIC CONTENT FOR FOUR REPORTING REGIONS

Per cent of total valid transactions by weight in reporting region

PARAFFINIC CONTENT %		REPORTING REGION			
		NWE		MED	
From	to less than	Cargoes	Barges	fob[(a)]	cif
80 and above		11	16	7	9
75	80	10	6	9	10
70	75	18	12	58	28
65	70	23	25	16	25
Less than	65	20	17	0	19
Not Reported		18	24	11	8
TOTAL		100	100	100	100

a) Possibly poorly based sample, see text

Source: Table A.4.8

4.24 There is considerable flexibility in the uses to which naphtha of particular grade in the middle paraffin ranges can be put, although there is a presumption that naphtha with a 60 per cent paraffinic content would be routed to a reformer for gasoline manufacture and a 80 per cent grade would go for cracking to olefines. In between, the technical requirement will depend quite specifically not just on the technical properties of an individual plant but also on the position of the manufacturer at that moment: his stocks, demand for a range of products and prices. It is not possible to draw any conclusions about buyers of naphtha from quality data, therefore, except at the extremes. Nonetheless, given the fact that most of the trade lay between 65 per cent (general purpose) to 80 per cent (chemical feedstock) paraffinic content, the importance of chemical buyers is evident.

CORRIGENDUM to Final COMMA Report

4.25 The different requirements of petrochemical plants and the possibilities of blending naphthas, yield an aggregate pattern of trade in which paraffinic content appears to vary randomly. This is borne out by the COMMA results. They show a single mode at the paraffinic content typically used in the petrochemical industry, and they suggest that there are no systematic differences between regions.

GASOIL: Sulphur Content and Specific Gravity

Sample Base

4.26 The samples of gasoil trade are large for all reporting regions. In NWE, there were 304 valid cargo transactions (4.4mn tonnes) and 4746 barge transactions (8.0mn tonnes). In the Med, there were 93 valid transactions FOB (1.4mn tonnes) and 112 CIF (2.4mn tonnes). Qualities were well-reported, data were unavailable on less than 11 per cent by weight of each quality-sample except the sulphur content of Med FOB trade (18 per cent).

4.27 Some traders were omitted from the samples, notably Vanol which is a large barge trader specializing in gasoil. Such omissions may have biased the samples by obscuring trade in certain qualities of gasoil. In particular, for reasons outlined below, it appears that Russian material may have not been adequately covered. Despite these omissions, the samples are large enough to cover a wide spectrum of trade.

Sulphur Content

4.28 Table 4.7 summarizes data, given in more detail in Tables A.4.9-A.4.12, on the percentage breakdown by weight for sulphur content in the gasoil trades. As with the ranges of lead content in mogas, the ranges of sulphur content include the lower limit and exclude the upper.

4.29 None of the reporting regions displayed significant activity in gasoil of sulphur content from 0.4 to less than 0.5 per cent or of less than 0.3 per cent. In NWE, there was heavy trading (particularly in barges) in the range which included 0.3 per cent sulphur, and also some trade in the range which included 0.5 per cent. There was some cargo trade in grades from 0.6 per cent and above, but little barge trade. In the Med, most trade was in gasoil of sulphur levels from 0.5 per cent upwards, and trading in grades from 0.3 to less than 0.4 per cent sulphur was less pronounced than in NWE.

4.30 As for the lead content of mogas, sulphur levels in gasoil are significantly influenced by national regulations. Except when the market in low sulphur material is slack, the costs of desulphurizing and the existence of blending valves mean that gasoil is normally sold to the maximum allowable sulphur specification. The FRG has the lowest limit in Europe, proscribing levels above 0.3 per cent sulphur, although some parts of the country allow levels up to 0.5 per cent. At the time of the COMMA exercise, the limit in Belgium was 0.4 per cent, and in the Netherlands and Sweden was 0.5 per cent (these countries are reducing their limits to 0.3 per cent in October 1980). The maximum allowed in Switzerland was also 0.5 per cent, in Denmark 0.7 per cent and in the UK 0.75 per cent. Greece, Turkey and areas outside Europe, notably the Far East, have less stringent sulphur regulations.

TABLE 4.7

GASOIL: SUMMARY OF QUALITY SORTING BY SULPHUR CONTENT FOR FOUR REPORTING REGIONS

Per cent of total valid transactions by weight in reporting region

SULPHUR CONTENT % wt.		REPORTING REGION			
		NWE		MED	
FROM	TO LESS THAN	Cargoes	Barges	fob	cif
0.6 and	above	6	0	37	35
0.5	0.6	23	18	36	24
0.4	0.5	5	4	0	8
0.3	0.4	46	70	9	20
Less than	0.3	13	1	0	7
Not Reported		7	7	18	6
TOTAL		100	100	100	100

Source: Tables A.4.9, A.4.10, A.4.11 and A.4.12

4.31 The relatively severe German sulphur regulations indicate why there was a sharp peak for barges in the sulphur range which included 0.3 per cent. The smaller peak at 0.5 per cent for barges was probably generated by demand in the Swiss and Dutch markets and in those areas in Germany which permit the higher level. That the barge trade does not serve countries which permit sulphur levels above 0.5 per cent is consistent with the insignificance of the trade in such grades. The cargo trade does serve such countries and it also serves Germany (via trans-shipment to barges); the analysis of the sulphur levels of the gasoil cargo trade is consistent with this. Similarly, the pattern of trade in the Med is less influenced by the German market, and more by countries in Europe and the Far East which have higher sulphur limits.

Specific Gravity

4.32 The specific gravity of most of the gasoil traded was in the range 0.830-0.855 (Tables A.4.9-A.4.12, summarized in Table 4.8). The mode of trade was 0.845-0.850 for each reporting region except Med FOB where it was 0.840-0.845. The distributions for NWE were slightly skewed, with more trade at specific gravities below the mode than above it. The skewness is not strong though, and for all reporting regions the pattern cannot be distinguished from a normal distribution of random scatter about the mode.

5.20 Transactions were analysed by category of participants in four groups: NWE cargoes and barges; all products and gasoil. The breakdown is given in Annex 5 for the twelve months of the COMMA year. The results are summarised below:

	Groups					All
Per cent by weight	1	2	3	4	5	Groups
All products						
NWE cargoes	52	11	16	18	3	100
NWE barges	35	11	18	30	6	100
Gasoil						
NWE cargoes	43	12	18	22	5	100
NWE barges	24	11	24	33	8	100

Inevitably, there are biases in the reporting. The most important is the distortion introduced by the requirement that, where transactions were between participants, only the seller reported. (This was necessary to avoid double-counting.) This raises the question whether, in such inter-participant trade, one group was more likely to be sellers than another: for example, are refiners more likely to be selling to traders or vice versa? Where there was trade with non-participants, the same considerations arise; if one group deals more with non-participants than another, for structural or merely historical reasons, the breakdown would not be representative of the trade as a whole. The only way of answering these questions would have been for both parties in a transaction to have been reported by type: this was considered early on but rejected as introducing too much of a not necessarily revealing complexity. Without answers to the questions, it is best to treat the analyses as though participants were randomly involved and the result were representative, but to retain reservations.

5.21 The breakdowns are interesting in their own right. As might be expected, the refiners (Group 1) are the most important single group and accounted for 46 per cent of total barge and cargo trade reported. Traders (Group 4) were next in importance, accounting for 23 per cent. An obvious reservation here might be that refiners are, on the face of it, more likely to be suppliers than buyers but this was probably not the case: product was short during the COMMA year and refiners were looking for supplies; in any case, refiners have increasingly been adopting a policy of treating the spot market as a source of product for balancing, rather than a dump. This finding highlights the structural part played by the spot market in the supply arrangements of integrated companies. There is a tendency to think of the market as existing for the benefit of the independent traders but it is, more importantly, a facility used by larger companies for the purposes of balancing at the margin. However, there is a difference in the parts played by different groups between the cargo and barge trades. In the former, the refiners accounted for two-and-a-half times the share of the traders while, in the latter, they held equal shares. This finding is expected, given the nature of the two trades (see chapter 3), although the role of traders in the cargo trade may have been understated as a result of the non-participation of some important cargo traders. The involvement of the three other groups was similar in both markets, although the three accounted for more (35 per cent) in the barge trade than in cargoes (30 per cent).

5.22 The special place of gasoil in the spot market and of traders within the gasoil trade is highlighted by comparing cargo and barge breakdowns. Refiners had half the share of the gasoil trade in barges that they had in cargoes; Group 4 traders had 50 per cent more. Most of the rest of the refiners' lost share was picked up by Group 3 traders - from 18 per cent to 24 per cent - which included some important inland marketers. These differences are consistent with the structure of the market, as already discussed in chapter three; specifically, the place of independent oil companies in the German market for heating oil.

5.23 Shares by groups of the non-gasoil trade can be obtained by difference, and highlight the fact that the main difference between cargo and barge trades is in the role of gasoil. Generally, there is far less difference between the barge and cargo non-gasoil trade. This is shown below: The refiners share was more stable than the "all products" analysis indicated, and remained roughly the same in both markets. The differences were to be found in Groups 3 and 4. Although mainly comprised of traders, the Group 3 barge share was lower, possibly owing to the presence of a substantial naphtha cargo buyer, DSM. The Group 4 traders' share was substantially higher, although not by as much as for gasoil.

NWE CARGO TRADE BY REPORTING AREA

5.24 Participants registered NWE cargo transactions as through four reporting areas: ARA, the UK, le Havre and Hamburg/Bremen. The analysis below is based on data given in the weekly reports and the volumes are therefore not comparable with those for total valid transactions given in Chapter 3. Specifically, the analysis excludes late reports and transactions excluded from the 'statistical programme' (including quotations-linked transactions). In all, the analysis covers 752 of the 1026 valid transactions (1.3 out of 1.8mn tonnes).

5.25 The analysis does not present a complete account of trade by areas. To maintain confidentiality, COMMA does not report information which may identify individual transactions. When there was only one transaction reported for an area, the weekly report did not specify the volume of trade in that area, but did include the transaction in the total for NWE. Thus the sum of the volumes of trade in the four areas may be less than the total volume reported for NWE. Similarly, the analysis below for the whole year is biased in that it under-estimates the volumes of trade in each area. The effect is accentuated for those products and areas in which there was little trade since activity is more likely to be obscured by the cut off at two transactions per week. Also to maintain confidentiality, trade in the Hamburg/Bremen area was not separately identified. A trial analysis was carried out and showed that Hamburg volumes are small.

5.26 The limitations on the analysis mean that the results can only provide an indication of the relative positions of the reporting areas. They are summarized in Table 5.4 and shown in more detail in Table A.5.11.

TABLE 5.4

SUMMARY OF NWE CARGO TRADE BY REPORTING AREA [a]

Thousand tonnes

	NWE	ARA	UK	Le Havre
Premium Mogas	748	212	352	
Regular Mogas	70	15	2	
Naphtha	3615	2724	167	11
Gasoil	3382	1921	515	91
Max 1% Fuel Oil	1537	447	604	
Max 2% Fuel Oil	238	107	90	
Max 3.5% Fuel Oil	3312	823	1310	214
TOTAL	12901	6250	3040	315

(a) unadjusted for late reporting and excluding quotations-linked transactions:

Source: Table A.5.11

ARA transactions were the largest single category accounting for about 6.3mn tonnes. A substantial volume of trade (over 3mn tonnes) was also reported for UK ports, but there was little trade reported for the le Havre ports (about 0.3mn tonnes). The volume for NWE (12.9mn tonnes) exceeded the sum of volumes by area by 3.3mn tonnes, and indicates the volume of single transactions not separately reported.

5.27 The volume of ARA trade exceeded that for the UK mainly as a result of two products: naphtha and gasoil. These dominate ARA trade, making up nearly three-quarters of the total volume, whereas they made up less than one quarter of the volume of UK reports. For other products, the volume of UK reports was either about the same, or was greater than that for ARA. The relative importance of the UK is particularly noticable for premium mogas. Reports from le Havre were dominated by max 3.5% fuel oil.

PART II PRICES

Chapter Six

COMMA AND PUBLISHED PRICES

Introduction

6.1 The COMMA exercise has provided a large enough data base for it to be possible to carry out analyses that were not possible in the Checkrun, as well as repeating those that were.

i. At the least, they have provided a check on price levels, allowing the subjective price assessments of published reports to be set against statistically valid data from actual transactions.

ii. In the case of Mediterranean trade, it was hoped to extend the Checkrun evaluations in order to establish the validity of published reports.

iii. Where a comparison of price levels may not have been relevant (as, for some purposes it was not), it was possible to demonstrate the representativeness of published reports by showing where they were located in relation to the total distribution of reported transactions.

iv. The relatively large number of observations has made a dynamic analysis of some price relationships possible. That is, it has allowed us to take some steps towards answering questions about the ways price movements may relate to each other and, by inference, may influence each other.

v. An attempt was made to relate COMMA prices to crude values.

These are the subjects of the chapters 7 and 8 in Part II.

6.2 These analyses must all be seen in the light of definitions and the limitations of the data, which are the subject of this chapter. Moreover, market conditions during the COMMA exercise were such as to make any simple criteria of accuracy - such as those used in the Checkrun evaluations - open to argument. Price movements were so wide and sudden (see the monthly movements in weighted averages in Table A7.1) that large disparities have to be accepted, given the nature of the reports.

Published Price Series

6.3 Three price series were considered: Platts Oilgram Price Service, Petroleum Argus and the reports of the AFM. This is not an exclusive list, and other publications provide a commentary on the European spot market, notably Oil Buyers Guide and Petroleum Intelligence Weekly. But the ones chosen are those that focus more closely on the European market and have most influence on main market prices through the practice of quotations-linking. This usually means some formula linking a contract price to a published price at the time of lifting. Thus, a common form might be, "Platts mid at date of bill-of lading." Many variations are possible: Platts high (or low) plus (or minus) some margin would reflect quality and market expectations; some average of prices for a period before the date of bill of lading (of five days is common), would introduce a measure of instability, and so on. In addition, the price control regimes of some EEC members include explicit reference to published prices, and a number more take a close interest in them. By these means, published spot prices are introduced into main markets and have thereby acquired an importance that far exceeds the size of their spot market base. Platts is the most influential of the published series and it was for this reason that the Commission ~~was directed by the Energy Council to~~ set up the Checkrun in 1978.

6.4 Platts and Petroleum Argus are publications both of which provide a daily report. They cover much the same ground, with some detailed differences between products reported and their basis, notably in the Platts formulaton of a "high-low" range against the Argus "bid-offered" range. Both are subjective assessments of prices in the market the previous day, based on information gathered from companies active in the market, mainly by telephone. The information is unverifiable. As a result, the reporters must develop relationships of trust with their informants and use a good deal of discretion in evaluating their accuracy. Assesing the market prices on the basis of such information is a matter of subjective judgement, and often includes the need to "clean out" transactions that are considered to be untypical of a day's trading. The result stands or falls on the accuracy and reliability with which the reports reflect the day's trading, primarily to people who know it well. The acceptability of both publications within the industry is the only relevant testimony of their success, although it may also reflect the lack of alternatives. The greatest strength of these reports is the existence of corrective feedback from the market: if inaccurate, the reports do not remain so for long.

6.5 The AFM prices are quite different. A group of German independents provide a weekly account of their transactions to the AFM, an association of independent oil importers. After the application of certain rules, the high and low are reported as defining the range for transactions in the previous week. There is discretion for eliminating untypical transactions and also provision or auditing out-of-line reports. These rules and the methodology of Platts (which Argus resembles in most important respects) are described in some detail in the consultant's report on the Checkrun Commission. They will not be further considered here.

6.6 AFM more closely resembles COMMA prices in its statistical approach, although the actual price differences seem largest. Platts and Argus are, by contrast, different kinds of report and they report different things. The COMMA prices give the full range, being a statistically neutral record of the actual high and low of trade for the week. In addition, COMMA reports a weighted average price which aggregates the trade for the week. This is not at all comparable to the high-low midpoint of the published price series, although these are quite often used as an indicator of the central tendency of the market. In the next section, the nature of the different series will be more specifically defined.

The Properties of Price Reports

6.7 The Checkrun analysis provided definitive accounts of the properties of the published price reports. As a record of actual transactions, Checkrun (and COMMA) prices showed random movement, period-by-period, and this is consistent with the conclusions from studies into the behaviour of prices in other markets. But the published series, Platts and Argus, being assessments, showed a high degree of autocorrelation: statistical carry-through from one period to the next. This would be consistent with a method of subjective price assessment in which expectations and other non-trade data play a part and in which there is a tendency to smooth out violent price movements.

6.8 Second, and more important, the series are reporting different markets. COMMA and Checkrun are records of the full set of transactions reported. As such, the highs and lows spanned a range of conditions - quality, location, method of delivery, credit, currency and so on - that were reflected in a gap between high and low consistently larger than that of the published prices. These do not attempt to report the full range, but instead report on prices for a smaller range of typical, or most-traded, grades. This may be both practical and useful, but it raises problems if it isassumed that "high" and "low" prices mean just that, instead of a somewhat arbitrary range within the full range. Moreover, before the quality analysis contained in this report was available, nothing was known about the overall composition of trade in the spot market nor, therefore, about typical grades.

Accuracy

6.9 In the circumstances, no attempt was made to repeat the evaluative procedures in Checkrun and to establish the accuracy of the published reports. It is now clear that the reports are, strictly speaking, not comparable. Moreover, market conditions were such as to make inconclusive any rigorous examination of differences. Nonetheless, an analysis of price differences at the highs and lows was carried out.

6.10 A more meaningful approach has been to "place" the published prices in the distribution of the COMMA transactions by means of a bounds analysis. The statistical basis of this analysis is described in Annex A.7. It provides an estimate of how much of the actual trade could be found outside the published prices, indicating the amount of the trade covered by the price range; and it shows how much of the trade appears below the midpoint of the published prices, showing how symmetrically they are placed within the actual distribution of trade. Although it is not possible to work from the assumption that published highs and lows should correspond to the COMMA figures, it is a reasonable to require that the published range should span the main part of actual trade if it is to be representative.

Chapter 7

PRICE COMPARISONS

Introduction

7.1 The COMMA year was turbulent reflecting the price movements and uncertainties in the market for crude oil. COMMA started when the increases in spot crude prices that followed the distruptions in Iranian production had levelled off, although official selling prices were still moving up strongly. Spot product prices started at a generally high level and showed weakness through Summer, bottoming out in August/September. In that period, some prices dropped very steeply: for example, COMMA weighted average prices for gasoil barges by $51 between July and August; premium mogas barges by $54 between June and September; and naphtha cargoes by $28.4 between July and September. For a time, prices rose again: gasoil prices peaked in November, naphtha in December/January and mogas in January. Thereafter, with the exception of the fuel oils, prices all fell to levels below those at the start of the exercise. Price volatility is an inescapable feature of the spot trade, but price movements of this size are exceptional. In some cases, there were market reports (which would not have been picked up by the COMMA system) of prices moving by more than $10 in a day; in calmer times, movement of a $1 would be notable. Such turbulence makes price reporting more difficult and makes tenuous the relevance of historical price reporting systems to the market in a day-to-day sense.

7.2 The numbers of prices reports for each product over the COMMA year are shown for the four areas in Table 7.1

TABLE 7.1

NUMBER OF PRICE REPORTS BY REPORTING AREA: COMMA YEAR

	NWE		MEDITERRANEAN		TOTAL
	Cargoes	Barges	fob	cif	
Premium Mogas	13	45	0	1	59
Regular Mogas	2	24	0	0	26
Naphtha	35	19	2	1	57
Gasoil	40	52	6	14	112
Fuel Oil: Max. 1% sulphur	19	47	0	0	66
Max. 2% sulphur	2	28	0	0	30
Max. 3.5% sulphur	27	36	1	8	72

The underlined reports were those that went though the statistical analysis procedures described in Annex 7. The rate of price reporting does not exactly correlate with the distribution of COMMA transaction volumes because of the operations of the reporting rules, under which there are no price reports when there are less than three transactions. As might be expected, the thin Mediterranean trade is strikingly under-reported and the level of reporting in NWE varies greatly. In the latter, two product groups (regular mogas and 2% fuel oil cargoes and naphtha barges) were reported at a level that indicated virtually no trade at all. Three more (premium mogas and 1% fuel oil cargoes and naphtha barges) were reported at a level that did not yield statistically significant results from a more complex analysis. For the remaining nine price series, there was a large enough sample to carry out a full investigation: products in which prices were reported in about a half or more of the weeks of the exercise.

7.3 The sample base was sufficient to provide a representative set of prices although there were question marks over products where specialist traders were not represented:

i. Premium mogas (and, presumably regular). There was a good sample of transactions for premium barges but the paucity of reports for cargoes could reflect the non-participation of some important specialist blenders. It should be remembered, however, that mogas is not as much an item of trade as other products. Also, regular mogas is a far less important product.

ii. Fuel Oil. Although the amount of trade reported greatly increased over Checkrun levels, thanks to the participation of important barge traders, the absence of Scantrading and Coastal Trading left a large gap, since both companies trade extensively in this product.

iii. Gasoil. By far the most important of the products traded, and reported, it nonetheless lacked the potentially important contribution of a barge trader, Vanol, doing a substantial business in Russian grades.

None of these reservations necessarily vitiate the conclusions drawn from the analysis since, for reasons touched upon in the Introduction, even if the important specialist traders were not represented, a part at least of their trade would be included in other reports.

7.4 The results of the price analyses are given in Annex 7, with a full description of the methods used. Using COMMA as the basis of comparison, the relationships have been computed with Platts, Argus and AFM price series for:

i. Price differences at the high, low and weighted average/midpoints, expressed as the mean and the mean absolute deviations.

ii. Probabilities of COMMA prices being found above the high and below the low, and below the midpoint. This analysis was repeated after splitting the series into weeks when prices were rising and when falling, to indentify the response of the published series to different market conditions.

iii. Correlations of price movements, to identify any tendency to lead or lag the market

For reasons already given, differences between COMMA and the Platts and Argus prices are expected; for AFM prices, they are less expected. However, it is clearly of interest to know by how much published prices are likely to differ from the actual trade, and a measure of this is given by the Mean Absolute Deviation - the average of differences without sign. The Mean Deviation is invariably less, since random fluctuations will tend to cancel out. The bound analysis (item ii.) is of more interest since, as already described, it tells where the published prices are located in relation to the trade. After allowance for auto-correlation in the published series, no significant evidence of systematic leads or lags between COMMA and the other price series was identified. On the whole, the evidence confirmed the main conclusions of the Checkrun, with due allowance for the unusual market conditions prevailing.

Price Differences: NWE

7.5 - The following notes describe the placement of published prices in the distribution of COMMA reports, which is taken to be a surrogate for actual trade. Two measures are used: the mean deviation between COMMA weighted averages and published price midpoints, which provide a measure of any systematic bias in the reporting; and an estimate of the percentage of COMMA price reports to be found below the midpoint of the published prices, which indicates how symmetrically the published prices are located on the distribution of actual prices. Fuller data on the differences between COMMA and published prices have been computed and are given in Tables A.7.1-12. Thus, the differences between highs and lows may be of interest for their own sake, but are not a measure of the published reports' accuracy, mainly because the published reports do not cover the full range and are not therefore comparable. An analysis of excluded trade - the COMMA trade that lay outside the published prices - has also been carried out, but is not further considered here for the same reason.

7.6 Premium Mogas Cargoes (11 reports):

	Platts	Argus
Mean Deviation	\$5.0	\$7.2

Both the price reports were above the COMMA weighted average by a substantial margin. However, the sample was small - too small for a complete statistical analysis - and this result is only an indication.

7.7 Premium Mogas Barges (45 Reports);

	Platts	Argus	AFM
Mean Deviation	- $1.1	- $2.0	- $3.8
Below Midpoint	37%	37%	30%

All the published prices were placed low in the COMMA distribution, with more than two-thirds of COMMA prices estimated to appear above the midpoints. Price differences at the weighted averages confirmed this positioning. It is worth noting that the Checkrun analysis also showed AFM prices well down in the Checkrun price distribution.

7.8 Regular Mogas barges (18 price reports);

	Platts	Argus	AFM
Mean Devaition	- $4.5	- $4.0	- $3.5
Below Midpoint	32%	34%	39%

A smaller price sample showed published reports low in the COMMA distribution. Overall the picture was the same as for premium mogas, but the deviation at the mean was very much larger. This is a thin market, and presumably still more difficult to report accurately. Regular mogas tends also to be traded with reference to premium mogas prices, and may therefore receive less detailed attention.

7.9 Naphtha Cargoes (34 price reports):

	Platts	Argus
Mean Deviation	$1.2	$0.1
Below Midpoint	57%	46%

Naphtha was among the best-reported of the products in the Checkrun, and it remains so. It is a technical market for an industrial raw material in which there are few buyers and sellers; information is well disseminated and well-known; the market is, as a result, highly transparent. The price reports were both well-centred on the COMMA distribution, although price differences were considerably higher than with Checkrun prices, probably reflecting differences in market conditions.

7.10 Naphtha Barges (17 price reports):

	Platts	Argus
Mean Deviation	$0.3	$0.7

The barge market is much thinner than for cargoes, although trade was considerably above the Checkrun levels (3 reports in six months). Prices tend to be derivative of cargo prices, and published COMMA prices are similarly close.

7.11 Gasoil Cargoes (40 reports):

	Platts	Argus
Mean Deviation	\$2.3	\$0.9
Below Midpoint	65%	64%

Gasoil is the most copiously-reported of all the products in spot trade, and it is surprising that differences are as large as they are, given the amount of information available. (Gasoil transactions accounted for about two-thirds of total NWE report numbers: 30 per cent of cargoes and three-quarters of barges.) Even so, the difference at the mean showed Platts reporting high by more than \$2 and Argus by about \$1. Both reports were located at the upper part of the distribution, with nearly two-thirds of COMMA prices occurring below the midpoints. Average differences at the highs and lows were \$7 - \$8; the ranges between high and low were within \$1 of the COMMA range, which was about three times the Checkrun range. These data are all consistent with the special circumstances of the market in the COMMA year. As an, indication gasoil prices moved down through the first months of the exercise, rose to a peak in November and declined through the remainder of the heating season; second, they were above naphtha prices (by \$37 in June) at the beginning of the exercise and the naphtha-gasoil differential fluctuated widely thereafter.

7.12 Gasoil Barges (52 price reports):

	Platts	Argus	AFM
Mean Deviation	- \$0.4	\$0.1	\$0.5
Below Midpoint	55%	61%	53%

This is the only product in which there was a report every week of the exercise, with 4,750 barge transactions in the sample. Prices were widely apart at the high and low, but well-placed at the centre, exaggerating the experience with Checkrun. This is the most important product in the spot market, dominating the barge trade. However, although the mean deviation was exceptionally close to the weighted average COMMA price, demonstrating that there was no significant, systematic reporting error, the root mean square errors of published prices - a measure of the accuracy of the reports - were high. This casts doubt upon the week-by-week reporting of the published series, although is again explainable in terms of the turbulent market conditions. (This is a reservation that applies to almost all products.)

7.13 Max. 1% Fuel Oil Cargoes (17 price reports):

	Platts	Argus
Mean Deviation	\$3.8	\$0.3

This was a thinly-reported market, probably owing to the absence of some important specialist traders, particularly for the Scandinavian market. Although both Platts and Argus showed a high absolute deviation at the mean, the Argus mean deviation (the average of the year) was very much less than Platts.

7.14 Max. 1% Fuel Oil Barges (46 price reports):

	Platts	Argus
Mean Deviation	- $1.3	- $0.8
Below Midpoint	32%	39%

Both price series reported high; both were inaccurate at reporting the weighted average of trade by something over $2 (the mean absolute deviation). These are smaller figures than for other products, but it should be remembered that fuel oil is half the price of lighter products. The relatively small discrepancies are expected and reflect the steadier price development of fuel oil in general: price movements tend to be smaller and less volatile, reflecting the industrial nature of the market and the narrow range of technical specification.

7.15 Max. 2% Fuel Oil Barges (28 price reports):

Although there was an adequate number of price reports, only 4 usable price comparisons were possible because of the lack of matching published reports. No significant analysis is therefore possible.

7.16 Max 3.5% Fuel Oil Cargoes (28 price reports):

	Platts	Argus
Mean Deviation	$4.1	$1.0
Below Midpoint	75%	57%

Price reports were quite widely apart, with published prices well up in the COMMA range. In the case of Platts, an estimated three-quarters of COMMA prices were to be found below the Platts midpoint, with 60 per cent of the prices outside the Platts range. Given the relatively stable nature of this market, this is an interesting result, and one that suggests a systematic bias - quite possibly in the COMMA reporting sample, which does not include two of the most important fuel oil traders in the cargo market.

7.17 Max 3.5% Fuel Oil Barges (32 price reports):

	Platts	Argus
Mean Deviation	- $0.5	- $0.9
Below Midpoint	48%	48%

Published prices were much closer to COMMA than with cargoes, probably because the reporting sample was not biased. (The two traders mentioned above are most active in cargoes.) However, in both series, prices were high at the high, and about half of the trade lay outside the price ranges.

Price Differences: Mediterranean

7.18 The aim of COMMA was to gain more information about the workings of the market and not to repeat the Checkrun, of which the objective was the validation of Platts. But, since Mediterranean prices had not been included with Checkrun registrations, it was decided to use the opportunity presented by COMMA to fill this gap. In the event, registrations of Mediterranean transactions were low, and the effects of the reporting rules was to make the rate of price reporting lower still. Mediterranean registrations accounted for 28 per cent of total COMMA volumes (FOB 11 per cent and CIF 17 per cent) and only 8 per cent of price reports (FOB 2 per cent and CIF 6 per cent). For half of the products, there were no price reports at all and 4 of the 7 that were reported had only 1 or 2 reports. This left three products (gasoil FOB and CIF and 3.5% fuel oil CIF) for which any kind of comparison, was possible, and even these did not meet a minimum criterion of statistical acceptability. Nonetheless, simple differences were computed (Tables A.7.13-15) and are discussed below although more revealing statistical analyses were not possible.

7.19 The main activity in the Mediterranean is centred on Italy and, for FOB transactions, on the Italian West Coast and Island refineries. The latter is an export trade from refineries, some of which exist on contract processing. In 1979, Italy exported 22.5mn tonnes of oil products, of which 9.4mn tonnes went to EEC Countries. The most important products exported were mogas, 5.1mn tonnes (4.8mn net), and gasoil, 6.4mn tonnes (5.5mn net); although fuel oil exports amounted to 5.2mn tonnes, but these were offset by 4.3mn tonnes of imports. Contract processing by traders, which had been boosted by a favourable balance between spot product and spot crude prices at the beginning of 1979, and already declined by the time COMMA started with a change in the price relationship. Even so, the level of transactions reported was lower than expected. Trade sources have, however, suggested that an important part of this volume may have been lost to the system because it is not the invariable practice of processors to sell their product on the spot market; also, product lifted by participants within the context of their own processing deals would not be reported either. More generally, market information for the Med is more difficult to come by than for NWE, and this presumably makes difficulties for the publishers of price reports as well. It is for these reasons that it was considered to be particularly worth making the attempt to evaluate Platts in the light of COMMA reports since the Med price reports are generally considered to have a less secure base than the NWE reports.

7.20 Price movements in the Med during the COMMA exercise were obviously subject to the same influences as in NWE markets, but with additional factors contributed by the Italian domestic market specifically by government policy. Thus, there were 3 reports for gasoil CIF in the first 19 weeks of the exercise; 10 reports in the next 20 weeks; and one report in the last 13 weeks - the differences in the middle period being the attractiveness of Italy as an import market following the concession of subsidies for imports that were designed to alleviate the effects of price controls. FOB reports (exports) were relatively evenly spaced through the first seven months of the exercise, and there were no price reports after the second week in January. Five of the eight 3.5% fuel oil reports appeared within two months at the beginning of 1980, at a time when rising crude prices made straightrun fuel oil an attractive cracking feedstock for cracking. For both gasoil and fuel oil, these influences have for some periods put Med prices above those of the NWE, where they are normally below.

7.21 Gasoil FOB (6 price reports):

	High	Low	Midpoint
Mean Deviation ($)	1.6	-4.1	-1.4
Mean Absolute Deviation ($)	2.3	4.2	3.8

Platts reports were $4 below COMMA at the low and $1.6 above at the high, with mean absolute deviations at those levels of $2.3 and $4.2 respectively. Price differences fluctuated around those levels, except for one week (Nov. 5th) when Platts was $16.5 below the COMMA Low. There was no obvious explanation on the basis of technical quality, and it seems possible that Platts lagged a rise in prices: the COMMA weighted average of NWE gasoil cargoes (indicative but not comparable) rose $27 between October and November. On the basis of this small sample, Platts reported this product low in the COMMA range.

7.22 Gasoil CIF (14 price reports):

	High	Low	Midpoint
Mean Deviation ($)	0.2	1.8	1.0
Mean Absolute Deviation ($)	2.8	3.6	2.6

Platts was above the COMMA prices, on average but by relatively small amounts. With the exception of two isolated reports, at the beginning and the end of the exercise, the differences were of the same order of the averages given above. There was no consistent pattern. It is, however, of interest that Platts was below the COMMA price in 8 out of 10 observations during a short period of 8 weeks (weeks 48 to 03) when Med prices first rose above those of NWE cargoes, reversing the usual relationship. This occurred within the period (weeks 42 to 09) when, as noted, 10 out of 14 price reports occurred and it may be inferred that there was a lag in adjusting to the new, and somewhat anomalous, situation.

7.23 3.5% Fuel Oil CIF (8 price reports):

	High	Low	Midpoint
Mean Deviation ($)	2.8	0.8	0.7
Mean Absolute Deviation ($)	4.7	3.3	3.4

As with gasoil, although for different reasons, reports were bunched into a short period (weeks 02 to 10). Prices dropped sharply during this period: in NWE the COMMA weighted average price for 3.5% cargoes dropped by $29 between January and March - a very large movement for fuel oil.

In one week in the middle of this period, Platts' reports were $12.6 and $10.3 below the COMMA high and low respectively, which suggests that the assessment had overshot the decline: the Platts reports recovered in the next two weeks to levels closer to COMMA, the actual trade.

7.24 To summarise, the level of accuracy achieved by Platts in the Med during the COMMA exercise appeared to be the same as for Rotterdam prices. However, given the size of the samples available and the allowances it was necessary to make for the effects of a turbulent market, measures of accuracy such as those developed for the Checkrun analysis could not be applied and a more searching scrutiny was not relevant. On the strength of the average deviation from the weighted average, there do not appear to be systematic reporting biases in the three products considered; on the other hand, the deviation in any week was likely to be large - over $3 on average. At the least this provides some support for the opinion that the Med is a difficult market to report, lacking the highly-developed information net and structure of the NWE markets.

Dynamic Relationships Between Price Reports

7.25 By comparing price levels and their relationships with the distribution of trade, the above two sections have demonstrated how the published price reports are placed in relation to the actual trade in a static sense. Three further analyses were carried out in order to define the nature of the price reports and identify how they move in relation to each other. These were designed to answer two questions:

i. What is the characteristic behaviour of the price series? Are they true market reports, or something different?

ii. How well do they reflect movements in the market? Is there a tendency systematically to lead or lag price movements?

The analyses were: single series correlations; pairwise correlations; and an analysis of bounds for rising and falling prices. These are fully described in Annex 7, and the results are discussed below. They cover 8 products for which an adequate sample was available.

7.26 A true record of market prices exhibits random movement. (The significance of this point of definition was fully discussed in the Checkrun report.) Single series correlation analysis demonstrates the extent to which a price series is autocorrelated, ie non-random. The results of analysing published price midpoints and the COMMA weighted averages are summarised below:

	COMMA	Platts	Argus	AFM
Autocorrelated	3	8	7	1
Random	5	0	1	2

It is to be expected that COMMA prices, as a market report, would be random; AFM as well. However, where a price report is the result of aggregating a large number of transactions - as with gasoil barges - the randomness is much reduced. A strong autocorrelation for COMMA 1% fuel oil prices appears to be a somewhat freakish result, for which there is no obvious explanation. The non-randomness of published price series reflects the method by which they are derived: the inclusion of non-market indicators of sentiment as well as hard data; the tendency to smooth out large and sudden fluctuations; and the fact that, based in individual's views of reality, prices will tend to be consistent between periods. The distinction between COMMA and the published prices series is sufficiently marked to support conclusions about the subjective nature of the published series; it would probably emerge more strongly from analyses of daily price reports.

7.27 Weekly price movements were analysed in pairs (COMMA-Platts, COMMA-Argus and COMMA-AFM) to see how strongly they were correlated and whether there was any evidence of leads or lags. It is to be expected that the published price series, which are historical in nature, would lag the actual trade; it is also possible that, as widely-used price references, they might lead it. The correlations of price movements in the same week were not as consistently strong as might be expected, but they were significant. After "pre-whitening" to eliminate the effects of autocorrelation, there was little evidence of any systematic leads or lags. Again, however, this is not unexpected from an analysis of weekly aggregates: movements in the market are picked up quickly by the reporting system and it is, on the face of it, improbable that leads or lages would be measured in weeks.

7.28 A different approach was taken by splitting the price reports into two sets of price movements: separating the weeks in which prices rose from those in which they fell. The analysis of bounds was carried out on the two sets in an effort to identify systematic differences in the reponse of the price series to different market conditions. This analysis showed a marked difference in the placement of published prices within the distribution of actual trade in the two conditions. The results of the analysis are given in Table A.7.17; it shows the estimated probabilities of COMMA prices appearing outside the published prices (above the high and below the low) and how symmetrically-placed they were (the probability of appearing below the midpoint of the published prices). If the published prices lagged COMMA - which, as historical records, they might be expected to - they would tend to be left lower in the COMMA range when prices were rising, and higher when prices are falling. Thus, for a given series, the probability of COMMA prices appearing below the midpoint is likely to be less in a rising market than in a falling market. This hypothesis is supported by the analysis of 19 price-series (8 each of Platts and Argus; 3 AFM):

i. <u>COMMA below midpoint</u>. In 13 cases, the probability of COMMA prices appearing below the midpoint was less in a rising than in a falling market; in 2 cases it was the other way round; in 4 cases there was no difference. Taking an arithmetical average of probabilities for all cases*, 41 per cent of COMMA prices appeared below the midpoint in a rising market and 57 per cent in a falling market. Thus there was a 13-point difference, indicating a tendency to lag the market both ways.

*A convenient way of rolling disparate information together, but it has no strict meaning except as a roungh measure of the tendency.

ii. COMMA above high. In 12 cases, the probability of COMMA prices appearing above the high was higher in a rising market than in a falling one; in 4 cases the relationship was reversed and in 3 cases there was little change. On average, 30 per cent of COMMA prices were to be found above the high in a rising market and 23 per cent in a falling market.

iii. COMMA below low. In 13 cases the probability of COMMA prices appearing below the low was less in a rising than in a falling market, with two opposite cases and 4 no changes. On average, 18 per cent of COMMA prices were to be found below the low in a rising market and 25 per cent in a falling one.

This is a remarkably consistent result, and tendency of published prices to lag the market. It also supports the intuitively obvious presumption that prices are more difficult to report in a moving than in a stable market. In addition there were interesting differences between the price reports, shown below;

	Rising Market	Falling Market
Platts (average of 8 reports)	45	58
Argus (average of 8 reports)	46	53
AFM (average of 3 reports)	33	60

It would appear that Argus is quicker on to a falling market than Platts and that AFM lags the market by rather more than either. The latter result is unexpected, and difficult to explain.

Quality-Price Relationships

7.29 If there was only one quality of a product traded, at one location, by one means of delivery and one set of financial terms, there would be a single price with perhaps a limited spread to reflect the needs of individual buyers and sellers. In practice, products are traded under a wide range of conditions, and the price of a particular transaction is the resultant of the interaction of a number of variables. Theoretically, if every piece of price-determining information was available, it ought to be possible in an exercise such as COMMA to assign a value to the contribution of each. This is not possible for two reasons: the most obvious is the fact that only some of the data are available; second, the market is not perfectly responsive to each of many variables. (To which could be added: if the setting of prices were so mechanistic, there would be no need for a market.) Nonetheless, as with Checkrun, the relationship between prices and qualities has been investigated.

7.30 Paricipants reported important price-determining quality data for each product. Of these, the most completely reported were;

Mogas - specific gravity, lead

Naphtha - paraffins

Gasoil - specific gravity, sulphur

Fuel Oil - sulphur

Other data were reported, but incompletely (eg gasoil Cloud Point; fuel oil viscosity). The effect of the former on price were investigated statistically and the results confirmed a similar analysis in the Checkrun report.

i. The market deals efficiently with the price implications of gravity - as might be expected with a simple relationship, (Both gasoil and mogas are bought by weight and sold by volume.) The relationship was better for gasoil.

ii. There was no statistical significance in the lead content - which is not to say that there was no market significance: only that no statistical price-lead relationship emerged for either regular or premium grades.

iii. There was no significant price-paraffins relationship for naphtha.

iv. Sulphur was significant in both fuel oils but only explained a small part of price variance.

Some comments follow.

7.31 The market for mogas is thin; at any point of time, the amount traded is small. A buyer, therefore, is likely to have a smaller range of choices facing him than with other products. Since the basis of parity relationships is the opportunity to choose whichever of a range of goods offers best value at the price, and this determines the value of the goods in relation to each other, it is to be expected that the quality-price relationship in mogas should be imperfect. Moreover, while the price-gravity relationship is easily computed, the value of lead is more obscure. It has value related to cost (the cost of producing a mogas to the same specification at a lower lead content) but in practice the value is market-determined. By contrast with mogas, the market for gasoil is copious and abundant choice is available. The price effects of gravity differentials are therefore, fully valued. Gasoil sulphur is not significant.

7.32 The lack of a statistical relationship between paraffin content and naphtha price is expected. Paraffins are an important price-determining variable, but the value to a potential end-user is so specific to his circumstances at a point of time that little consistency is to be expected for the market as a whole. To take only the petrochemical manufacturers, each one has a particular technical configuration and a set of downstream requirements to satisfy. A cargo of naphtha will be valued into each system according to its stock position and assessment of demand and prices for a range of products. It is a complex calculation the result of which may be, for example, to put different values on naphtha cargoes of the same quality at different times. In addition, although paraffin content is crucially important, other quality data - sulphur, for example - may be the deciding ones.

7.33 Fuel oil grades are defined by sulphur content. The analysis looked at the differences in price within a grade (1%, 2% and 3.5%) in relation to the weighted average sulphur content. Since much of the trade is reported to a maximum specification, this approach could not extract the crucial information - which exists in the relationship between grades. Sulphurvalues were therefore computed from price and sulphur differences between 1% and 3.5% grades, based on barge reports. The results (see

Table A.7.18) show how widely the sulphur value has moved, from $12 per degree of sulphur at the end of June to $5 at the end of November and up again to a peak of $17 in February. Sulphur values normally fluctuate in the range $5 - $8, and are set by the demand for 1% fuel oil. The decline reflected low levels of demand from Scandinavia, where storage was full, and the February peak occurred in a longer period when the premium rested in the range $10 - $13. Being the difference between two other prices, such volatility is not surprising.

(NOTE: More information on quality-price relationships will become available from KKC, which is preparing an analysis of weighted average prices for the quality categories discussed in chapter four.)

Conclusions on Accuracy

7.34 In considering the accuracy of the published price series, using COMMA as reference, it is natural to start with the prices as published: the highs and lows put out daily by Platts and Argus and weekly by the AFM. The differences at these levels are large, which is important information but does not necessarily invalidate the price series: none of them cover the full range of trade whereas COMMA did. An indication of these disparities is given by the amount of COMMA trade appearing outside the published price limits. This is summarised below:

TABLE 7.2 EXCLUDED FROM COMMA TRADE*

	20-29%	30-39%	40-49%	50-59%
Platts	1	4	1	2
Argus	0	3	2	3
AFM	1	2	0	0

*The number of price series which exluded the indicated (estimated) proportion of COMMA trade.

For eight of the series where this analysis was possible (19 in all) more than half of the COMMA trade was excluded, which underlines the partial and selective nature of the price ranges chosen. There is little more to be said, since the prices are not strictly comparable, but this analysis does confirm the fact that the price series are not, and in the COMMA year were nowhere near, the actual highs and lows of the trade.

7.35 A better index of accuracy is the relationship between the centre of the published price range and the weighted average COMMA prices. The mean deviation (the average of differences over the period) shows whether there is any systematic bias in the published reports. These are summarised below:

TABLE 7.3

MEAN DEVIATIONS: COMMA WEIGHTED AVERAGE VS. MIDPOINTS

Published Price Range from COMMA

Within	$1	$2	$3	$4	$5	More than $5
Platts	3	3	1	1	2	1
Argus	7	1	1	0	1	1
AFM	1	0	0	2	0	0

There was no apparent bias above or below the weighted average. The differences are large, although it is notable that 7 of the 11 Argus series examined were within $1 of the COMMA average, which shows that over time the repoots are not biased.

7.36 If the average differences at the mean are computed without sign, the resulting mean absolute deviation is a measure of the amount by which the published series differed from COMMA in any week. It is invariably larger than the mean deviation, and is a measure of accuracy. These are summarised below:

TABLE 7.4

MEAN ABSOLUTE DEVIATIONS

Published Price Range from COMMA

Within	$3	$4	$5	$6	$7	$8	More than $8
Platts	2	2	2	2	2	1	0
Argus	1	3	2	0	2	1	2
AFM	0	0	0	0	0	1	2

The difference in patterns between this and the previous table shows how prices fluctuate around, and over time will converge upon, a mean. However, what concerns a company using one of the price series is not whether it is accurate over a period of months but whether it is accurate today and tomorrow. On the above indications, the published prices were inaccurate by a large margin. However, it is important to remember that: the midpoints of the published price ranges have no strict meaning; they do not represent a trade in the very concrete way that the COMMA weighted averages do. One result is that the COMMA average will fluctuate week-by-week as the composition of trade randomly changes whereas the published prices, assessing the prices of a narrower range of goods, are likely to develop more steadily. It is another aspect of the observation made above: that the series are not reporting the same things.

7.37 If a published series is located across the main body of trade, it will be symmetrically-placed above and below the published mid-point. The table below summarises the estimates made of the amount of COMMA trade appearing below the midpoints. If the reports were symmetrically-placed across the trade, 50 per cent of COMMA prices would appear below the midpoint. The summary table is therefore organised to show how far the reports were from this ideal: thus, "0-5%" means ttat the range 45 to 55 per cent of COMMA trade appeared below the mid; "5-10%" means within the range 40-45 and 55-60 per cent, and so on.

TABLE 7.5

TRADE BELOW THE MIDPOINTS OF PUBLISHED PRICES

	50 per cent of COMMA trade, plus or minus....				
	0-5%	5-10%	10-15%	15-20%	20-25%
Platts	2	1	3	1	1
Argus	2	1	5	0	0
AFM	0	2	0	1	0

Eight of the published prices were within 10 per cent of the 50 per cent ideal, which is probably acceptable. Any such judgements are necessarily arbitrary. What is important is the understanding that analysis provides.

CHART 7.1

HIGHS AND LOWS AS AN INDEX OF COMMA WEIGHTED AVERAGE

Index: COMMA weighted average = 100

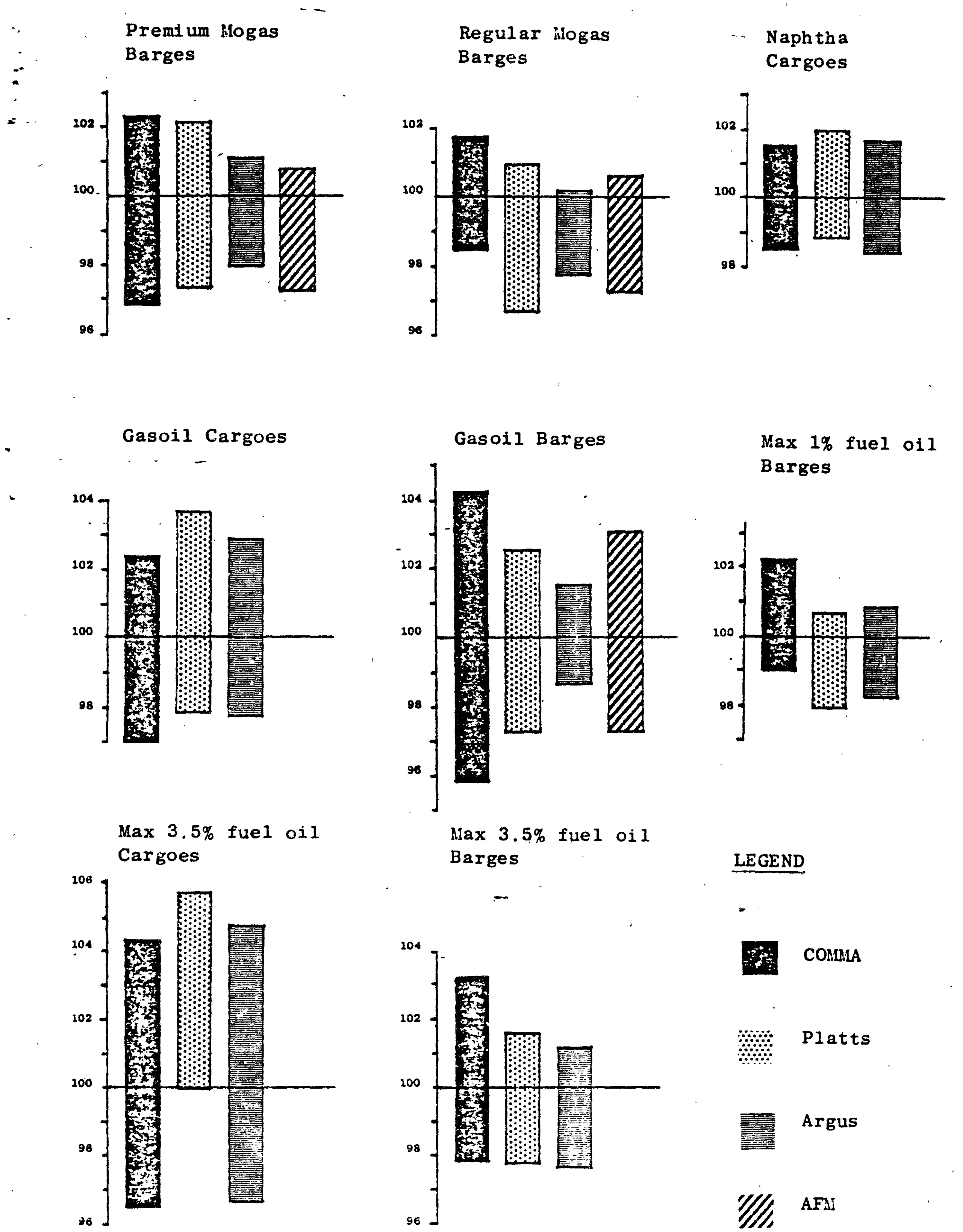


CHART 7.2

COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : PREMIUM MOGAS BARGES

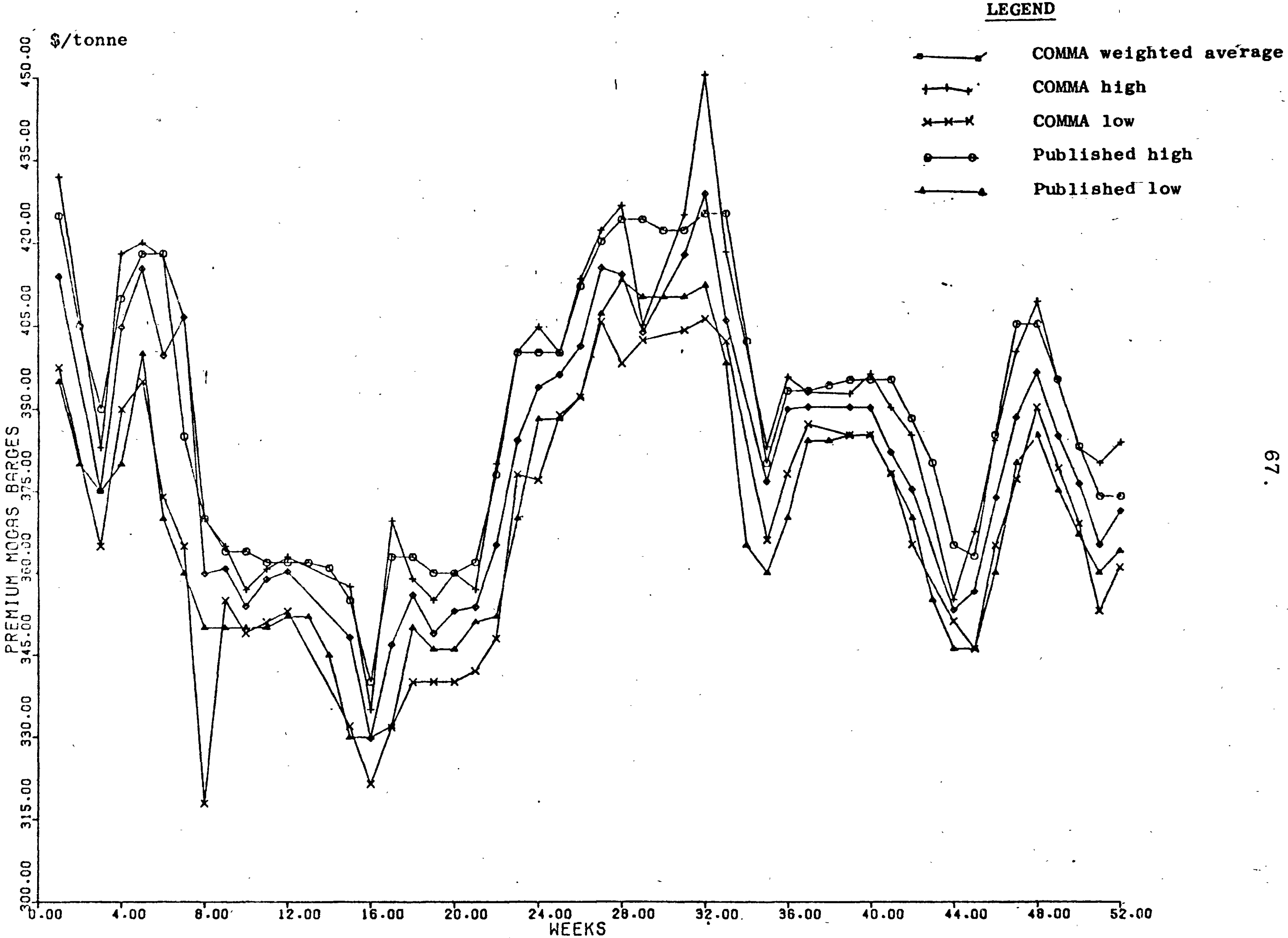


CHART 7.3 COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : NAPTHA CARGOES

$/tonne

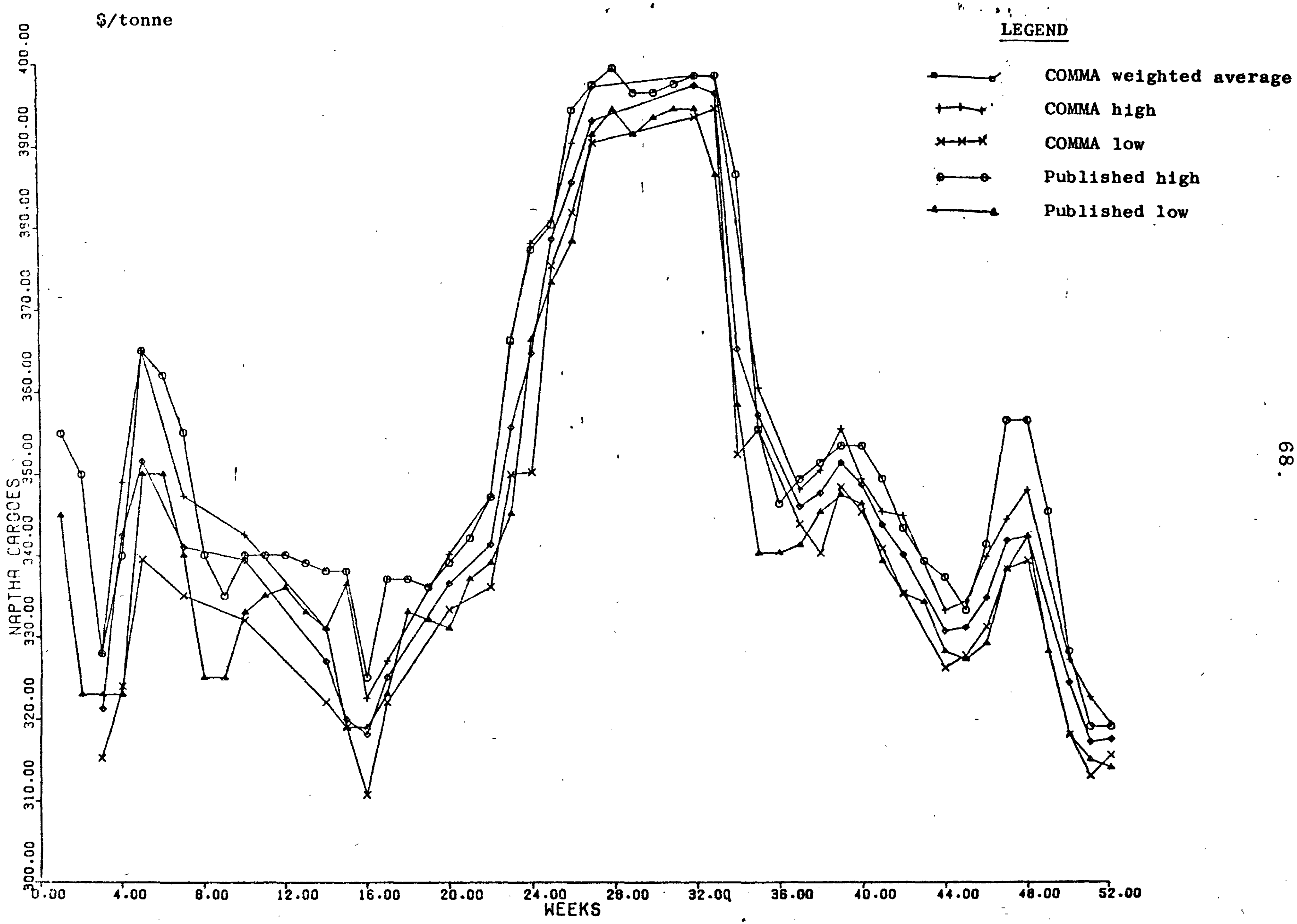


CHART 7.4 COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : GASOIL BARGES

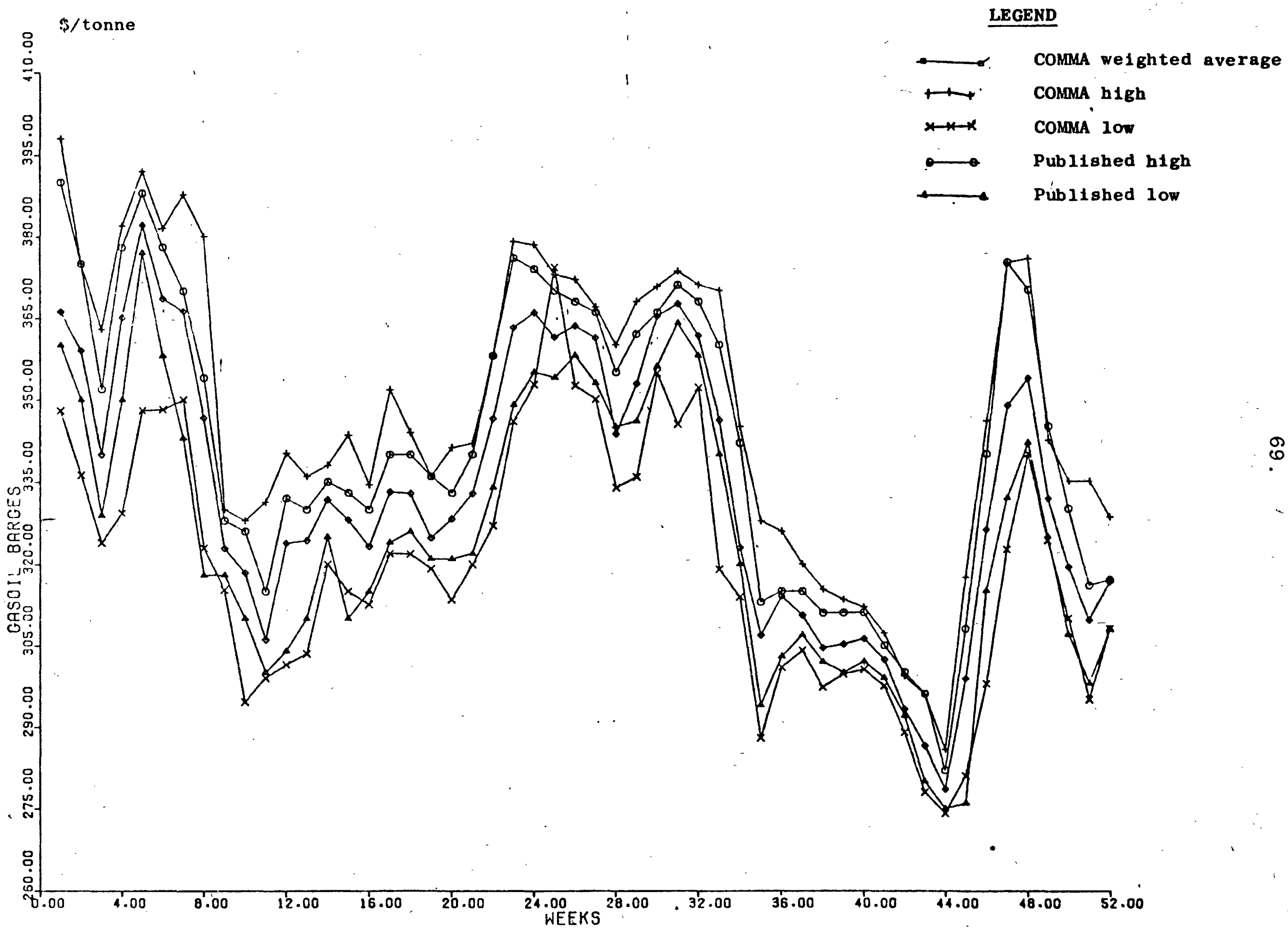


CHART 7.5 COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : GASOIL CARGOES

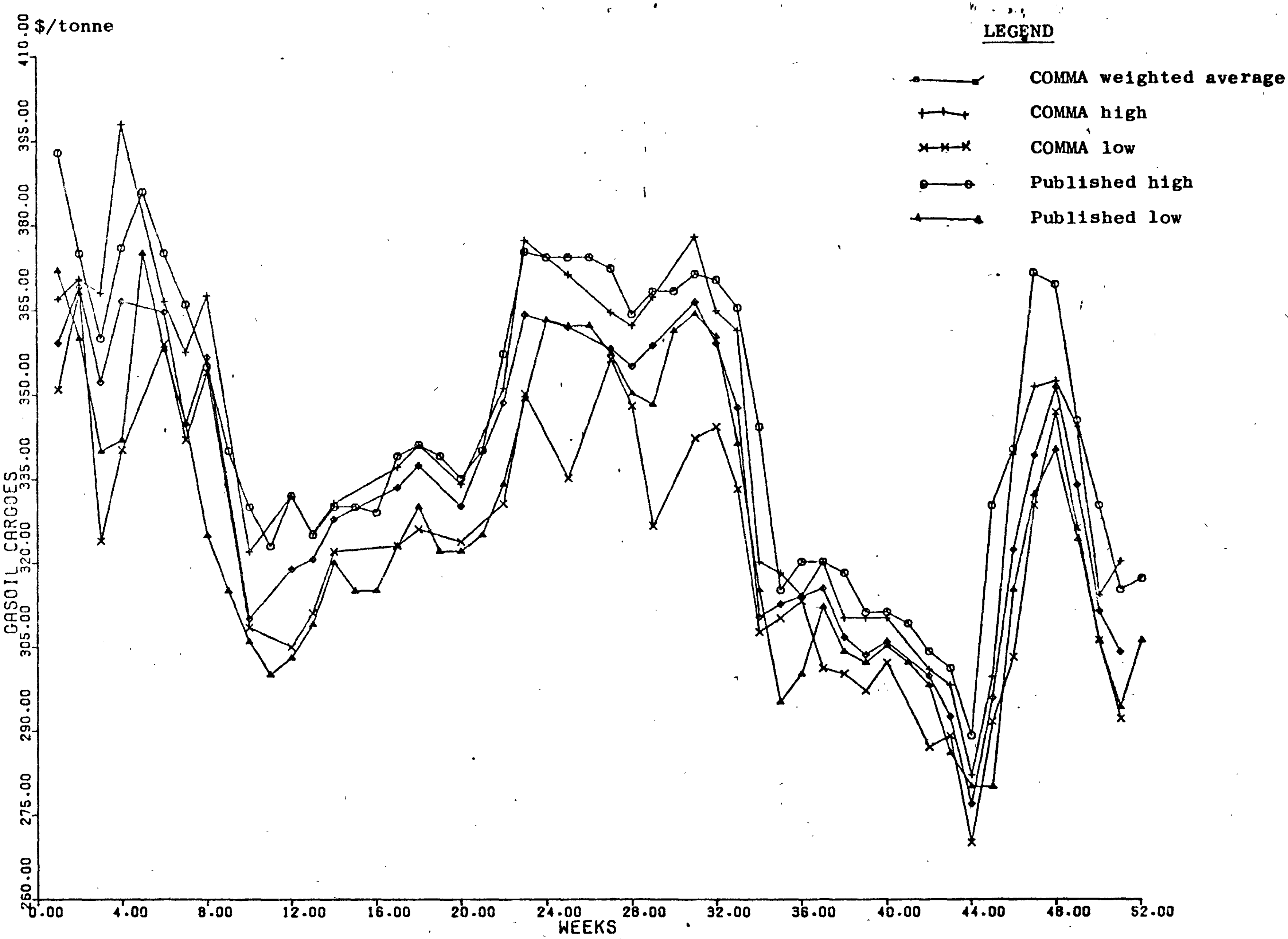


CHART 7.6 COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : MAX 1% FUEL OIL BARGES

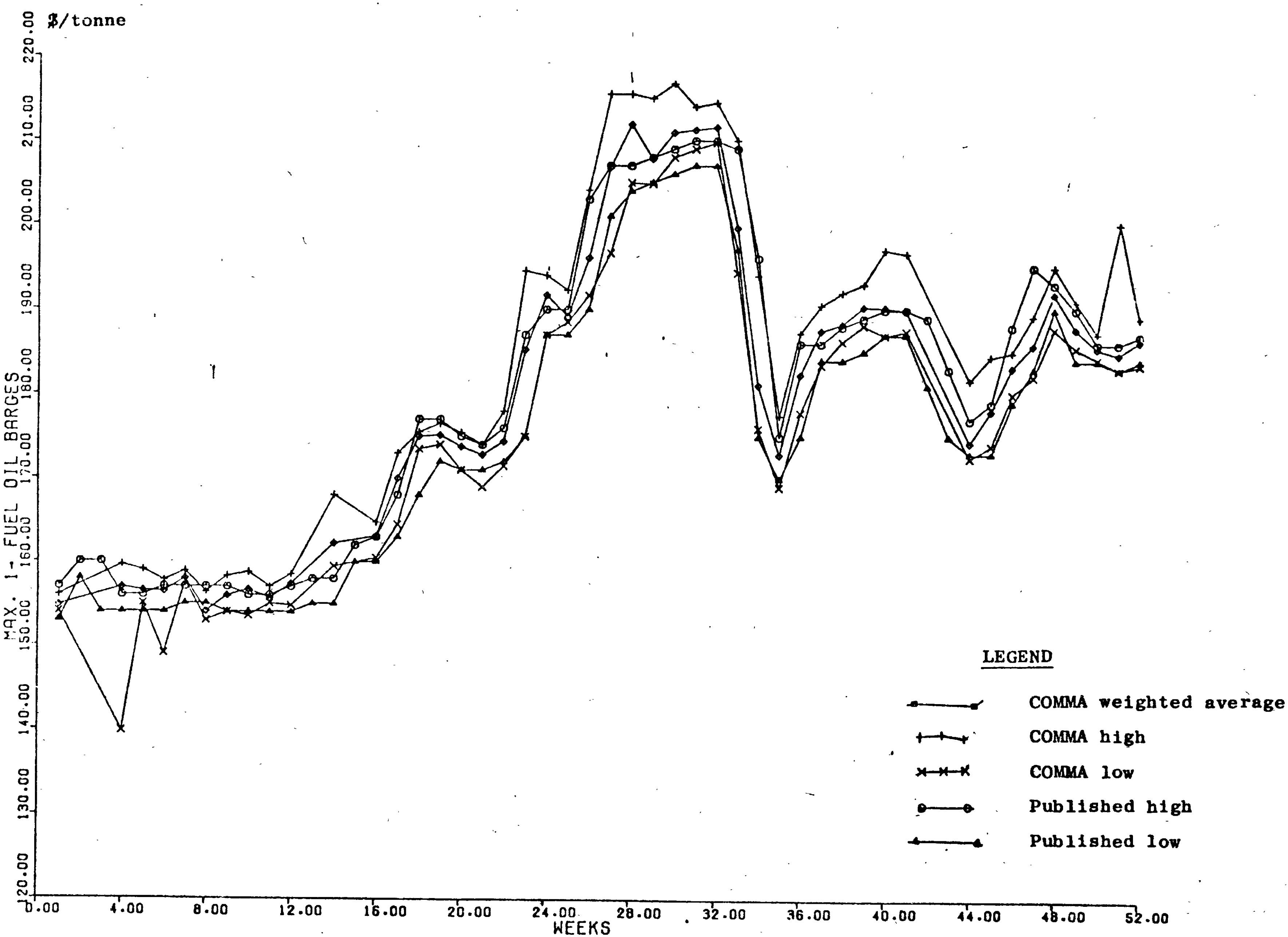


CHART 7.7 COMMA AND ARGUS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : MAX 2% FUEL OIL BARGES

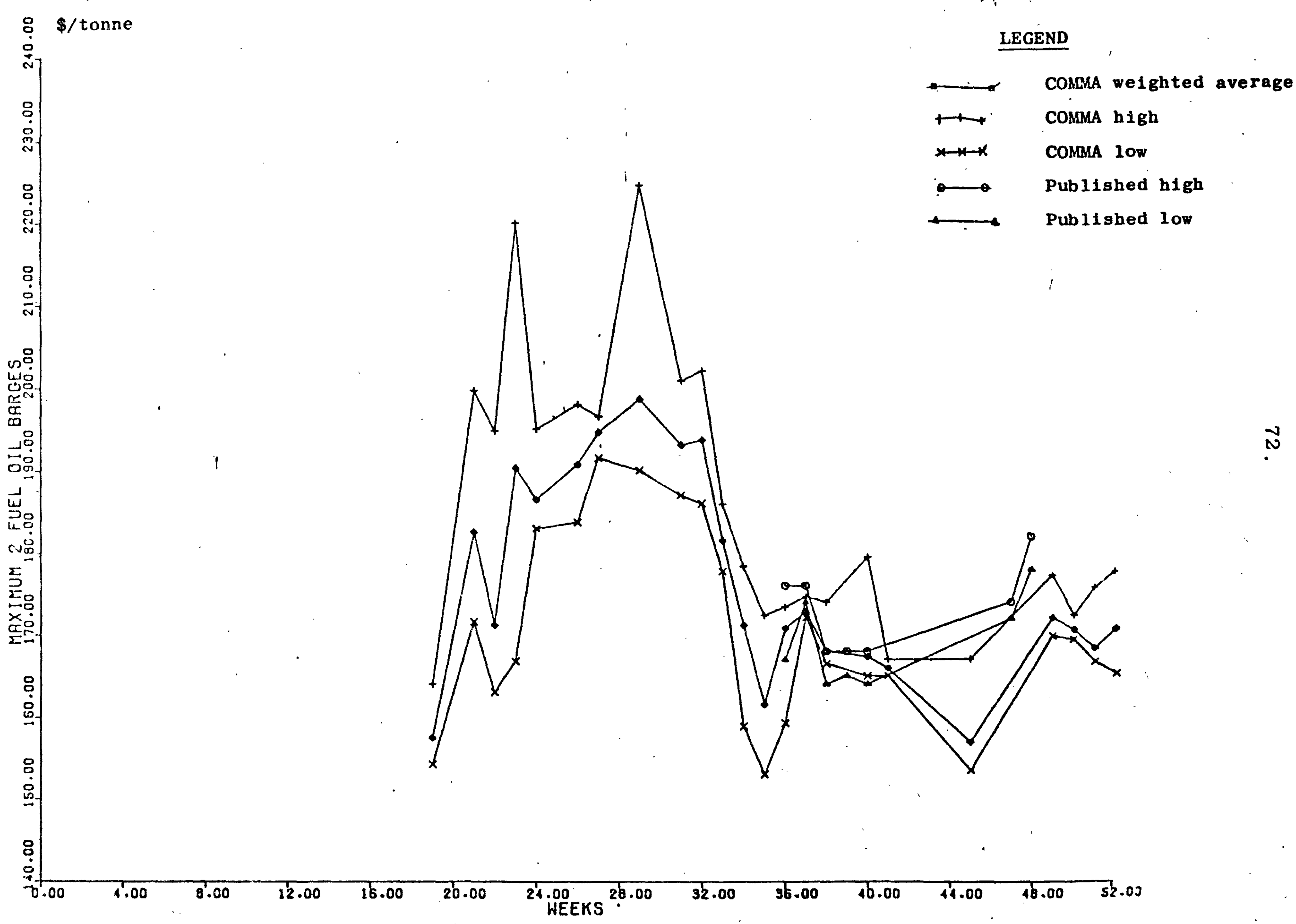


CHART 7.8 COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : MAX 3.5% FUEL OIL BARGES

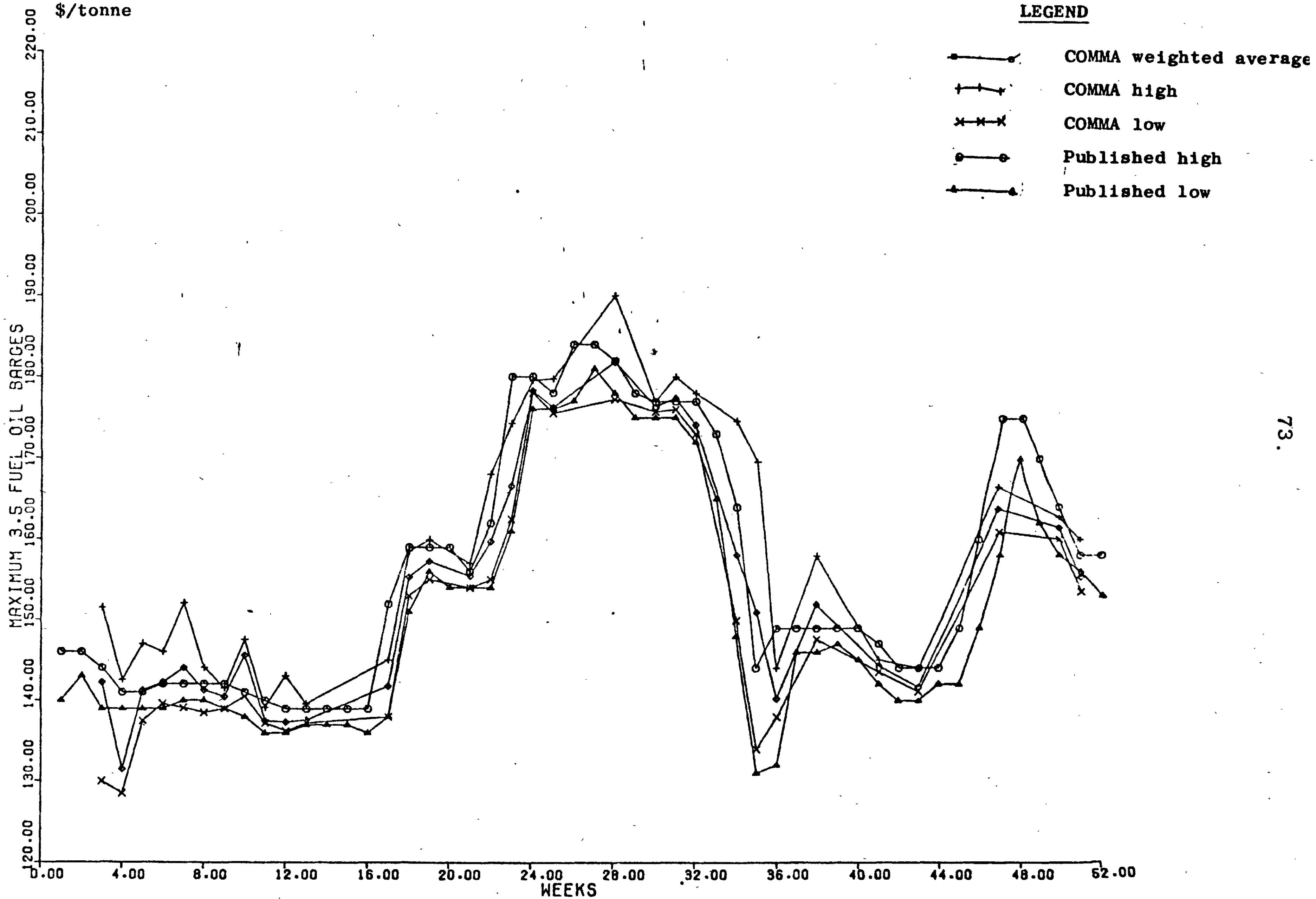
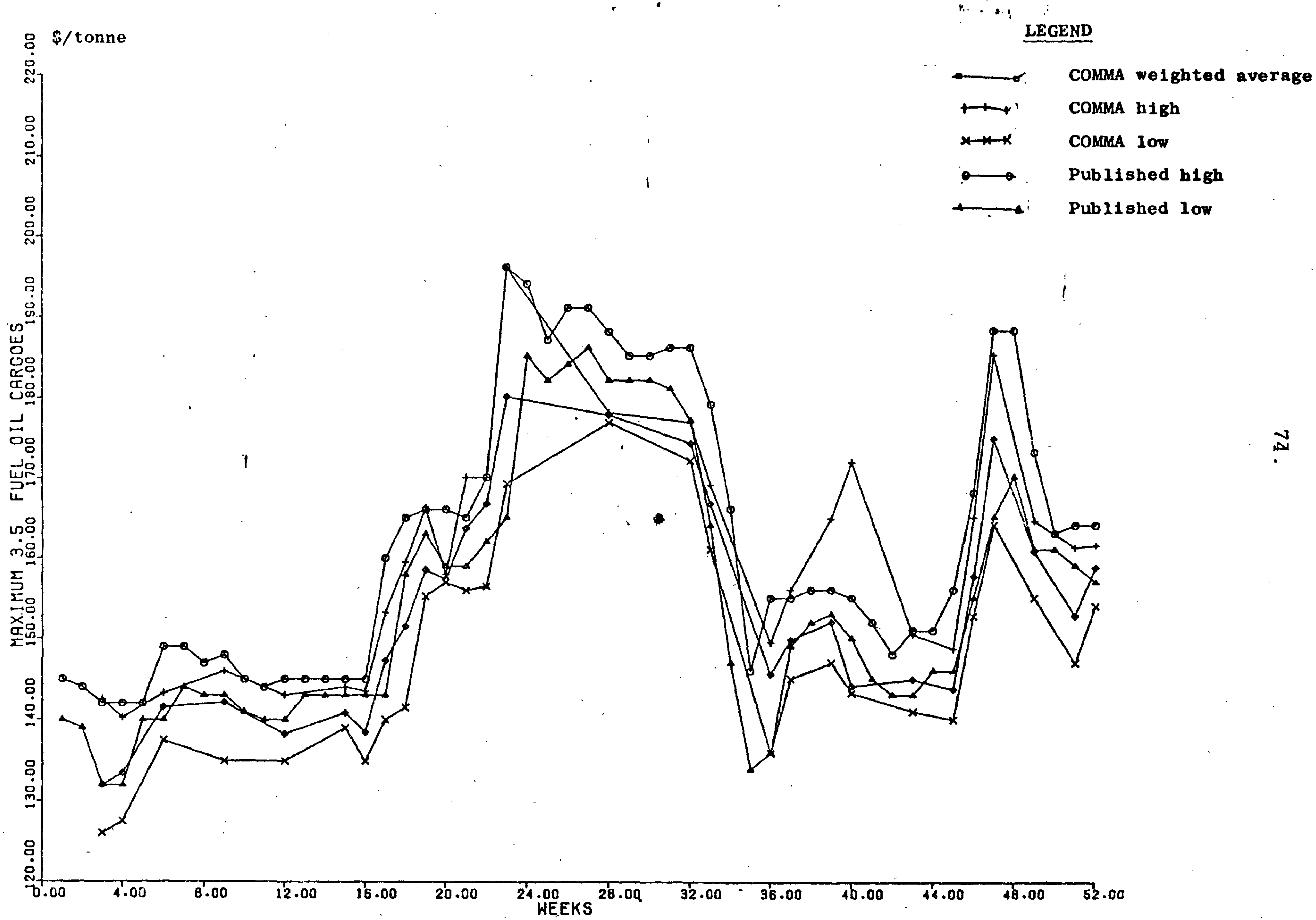


CHART 7.9 COMMA AND PLATTS HIGHS AND LOWS AND COMMA WEIGHTED AVERAGE : MAX 3.5% FUEL OIL CARGOES



Chapter Eight

OTHER PRICE RELATIONSHIPS

8.1 Two further analyses were carried out, to explore the relationships of COMMA prices with inland prices and with spot crude prices. These represent elements of the upstream and downstream of the spot market. They are all linked but the links may be tenuous and, although economically logical, difficult to identify statistically.

COMMA AND INLAND PRICES

8.2 Inland markets are largely supplied through distribution systems that are part of the integrated oil companies or, if not through integrated systems, through independently-owned distribution systems that receive their supplies under term arrangements from local refineries. The proportion supplied to the end-user through independent companies varies between countries and between products in national markets. The greatest part of the products supplied to the market, is bought under long-term arrangements: the oil industry, it has often been said, is a term industry in which gaining access to supplies on a secure basis has a high priority. Spot supplies are, therefore, a small part of the total but have in recent years appeared to exercise a disproportionate influence upon main market prices. It is difficult at times, watching the industry from outside - and particularly when prices are rising very rapidly - to avoid the conclusion that, because inland and spot prices rise together, they are in some way causally linked. And because spot prices move first, the conclusion is sometimes drawn that they lead main market prices and that the volatility of the spot market is a source of instability in main markets. The practice of linking contract prices to spot prices (see the discussion in chapter five) makes this connection manifest, and its existence has helped to focus attention on the spot market as a potential a source of price turbulence elsewhere. For these reasons, it was decided to keep a watch upon main market prices in relation to COMMA prices.

8.3 The price series used to track main market prices was "Consumer Prices": a report on prices to end-users, net of taxes, notified by EEC member governments and published weekly by the Commission (Commission Oil Bulletin). These prices were brought to a common base of US dollars per tonne and adjusted, using estimates of distribution costs supplied by the Commission, to bring them to a level approximating to refinery netbacks. These prices were then compared with COMMA prices. There are many objections to this process:

i. There is no consistency between the bases of prices reported by governments.

ii. The consumer prices themselves subsume a range of delivery and market conditions, and the single average price for a national market may resemble none of them.

iii. Distribution costs are highly specific to local market conditions.

Every market breaks down into regional markets, each with its own characteristic pattern of prices and costs. It is difficult to see how the Ruhr, for example, can be combined with the Hamburg and upper Rhine regions. At the limit, each refinery may legitimately regard itself as sui generis, and not strictly comparable with others. In spite of such cogent objections to the Consumer Prices series as an accurate measure of price levels (and, similarly, to the adjusted prices as netbacks), it was considered that price movements week-by-week would provide a useful indicator of changes over time, in terms of trends and relationships.

8.4 Two sorts of analysis were carried out: one simple and one complex. At the simplest level, COMMA prices were computed as a percentage of netted-back consumer prices to give an indication of relative movements. These are shown in Annex 8 (Tables A.8.1-2). Although there are marked differences between national markets which do not concern this report, the general trends were quite consistent: COMMA prices dropped in relation to inland prices through the exercise: they started well above and ended at or below the consumer prices.

i. Premium Mogas: COMMA prices started at 42 per cent above the estimated netted back average consumer price for the EEC, with prices ranging between 47 per cent of COMMA in Italy to 78 per cent in the UK. By the end of the exercise, the EEC average consumer price was 10 per cent above COMMA and the range was between 3 per cent below in Italy to 22 per cent above in France. Regular Mogas prices followed the same pattern.

ii. Gasoil: At the start of the exercise, the EEC average was 38 per cent below COMMA and the range was between 55 per cent below (Italy) to 31 per cent below (West Germany). At the end of the exercise, the average was 3 per cent above COMMA, and same national prices ranged between 10 per cent above (UK) to 3 per cent below (France).

iii. Fuel Oil: Average prices started at 20 per cent below COMMA levels with a range between 39 per cent below (Belgium) to Ireland (23 per cent above: Irish fuel oil prices were well above other EEC prices until towards the end of the exercise). They ended at 9 per cent above COMMA prices on average, with a range between 1 per cent above (Ireland) to 15 per cent above (Denmark).

The development of price relationships was not steady through the exercise. For one thing, the relation is between two independent-moving price series. Even if domestic prices developed steadily - as they tended to - the spot levels were more volatile. The picture that emerges from this simple analysis is of main market prices converging towards spot prices with lags. Given the nature of the markets, it is what might be expected: the term structure of the main markets make changes slower than they need to be in the spot market, where they can respond immediately to change. Second, government pricing policies played an important part in the rate at which the main markets were able to respond to changes in the industry environment. Italian mogas and gasoil started at less than half spot levels and consistently lagged prices in other countries; gasoil in France was also "sticky". On the other hand, UK and Irish prices were consistently above the EEC averages. (It should be noted that the averages were arithmetical, not weighted.)

8.5 If a consistent pattern of leads and lags exists, whereby influences in the spot market feed through into main market prices in some relatively orderly fashion, it should emerge from statistical analysis. A more complex approach was therefore taken to the analysis of price relationships by computing cross-correlations between the consumer price series (as published) and the COMMA series. These are described in the technical note in Annex 7. The hypothesis being tested was that a relationship existed between spot and main market prices such that a movement in one was likely to be followed by a movement in the other within a certain period. The hypothesis seems intuitively obvious but, in fact, no consistent statistical relationships emerged. Where statistically significant correlations did exist, they were difficult to interpret - often confused by noise from "spurious" correlations. (There is no way, for example, main market prices can lead the spot market, and yet such relationships did apparently present themselves.) For this reason, it seems inappropriate to make too much of the terms where leads and lags were indicated. This conclusion is almost certainly the correct one, and for two sorts of reasons. First, the relationships between main market and spot market prices are anything but simple; the link is made through refinery economies. Second, the information may not be adequate to the analytical techniques. Thus, the Consumer Price series for some countries does not respond fully or symmetrically to changes in market conditions (because based on regulated prices) and there can be no correlations as a result. This does not mean that there are no relationships; only that they are not statistical relationships.

8.6 To return to the problem posed at the beginning of this section: do changes in spot prices "cause" changes in other prices? All we have observed is that both sorts of prices move, one more quickly than the other, approximately in the same directions. It is not necessary to assume that one causes the other. It is only necessary to observe that both operate within the same conditions but respond in different ways. It is in the nature of spot prices to move widely and rapidly, and of main market prices to track them. One fluctuates either side of a trend line; the other is the trend. This same paradox occurs in the relationship between spot crude and product prices, and will be considered below.

COMMA PRICES AND CRUDE VALUES

8.7 A single crude gives rise to many products and the relationship between crude and product prices is, as a result, complex:

i. Each product is sold into a separate market and prices are set by balance of forces peculiar to each: gasoline, naphtha and gasoil may all have areas of technical and price overlap, but the markets they sell into are fundamentally different.

ii. This disparate set of conditions is drawn together for a given crude by the fact that it yields a characteristic pattern of products under given refinery conditions. The market price of those products - main market, spot or any intermediate type - gives the crude its value, or Gross Product Worth (GPW).

iii. An adjustment for distribution costs gives the GPW on an ex-refinery basis that can be compared with the cost of crude into the refinery. The difference between the two is the gross refinery margin, against which should be set the variable and fixed costs of refining.

iv. The cost of crude is comprised of the price, (FOB) and transport costs, which vary independently.

The resulting picture is highly dynamic. The markets for crude and products are economically connected, each influencing and to some extent determining the other although the direction of influence is open to argument. The basis of comparison is further complicated by the lags introduced in the transportation of crude. A European refinery may run a slate that includes Middle East and North Sea crudes. Price increases in the former would not be reflected in the landed cost of crude at a refinery until some weeks after the, sometimes simultaneous, price increases in the latter. A realistic calculation of refinery margins would have to take these highly specific facts into consideration. This is to say that margin calculations are peculiar to individual refineries; any attempt to generalise for a market has to be an approximation, useful only for identifying trends.

8.8 The question of crude-product price relationships was a particularly lively one at the beginning of COMMA exercise. Spot prices had risen far above main market prices, as the previous section demonstrates. GPWs calculated on the basis of spot product prices yielded a margin on crude prices that was very large on crudes bought at Government Selling Price (GSP), and still significant on spot prices. For a period before COMMA started, it had been profitable to buy crude on the spot market, run it though export refineries and sell the products on the spot market. (The Italian Islands refineries were particularly active in this.) By the time COMMA started, this trade had slowed down but the margin on spot product prices was still substantial, calculated from a GSP base. Again the question of causality was raised: did the level of prices on the spot market act as a signal to the producers of crude to raise their prices? It was certainly true that some representatives of producer governments (and, it must be added, journalists and politicians in importing governments) referred to spot prices at Rotterdam in this context. The inference was that spot product prices may have led crude prices upwards. For this reason, a watch was kept on the relationship between the two.

8.9 Refinery margins were calculated on a monthly basis for a number of indicative crudes: Arab Light, Iranian Heavy, Zuetina and Bonny Light. (See Table A.8.3.) This simple approach does not attempt to confront the problems discussed above but, in the market conditions of the COMMA year, a more complex calculation would not have revealed significantly more about the main features of the changes in crude/products price relationship. These are shown in charts 8.1-2. The assumptions used in the calculations have been described in the monthly COMMA reports. (See the reports for August and October.) Briefly, GPW was computed from COMMA prices on the basis of winter and summer yields at Rotterdam hydroskimming refinries; the landed costs of crude were derived from GSPs and estimates of spot crude prices, plus freight. The refiner's margin is taken to be the difference between the two, minus a 50-cents estimated variable refining cost.

8.10 The most important relationship, because most directly comparable, is between spot crude and products prices. By the time the exercise had started, the large margins available on running spot crude for the spot products market had all but disappeared. (This was reflected in a reduction in processing deals at Italian refineries.) In June, the spot margins on Arab Light and Iranian Heavy were both a negative $1.2 per barrel; for Zuetina it was a negative $1.7. Thereafter, margins declined although all crudes showed higher margins again at the turn of the year when spot product rose. Between February and the end of the exercise spot crude prices were relatively stable (subsequently they fell sharply), and in fact there was little trade. The GPWs were also stable, moving within a band of less than a dollar. The spot margin was positive in only 6 of the 43 observations for the four crudes.

8.11 This is not an unusual state of affairs in the European market: negative margins were more the rule than the exception between 1974 and 1978. However, the size of the margins (or notional "loss" on spot processing) was to be measured in cents over the longer period whereas during COMMA it was to be measured in dollars. The question this raises is: who can afford to buy spot crude, if it has to be run at a loss? The answer is that the state of affairs in the period before COMMA began was exceptional: it has rarely been possible to buy crude on the spot market and refine it with the confidence of selling the complete barrel profitably on the spot products market. Even trader-processors generally have a substantial part of their production already committed, so that sales into the spot market from a processing deal are likely to be limited. For an integrated company, purchases of spot crude are a marginal addition to supplies. A large spot premium can be accomodated when most of a company's crdde is obtained under term arrangements at GSP, as was the case at the beginning of COMMA. As GSP levels rose towards spot levels, the premium was necessarily reduced. (Sometimes called the "scissors effect".) This convergence of prices is shown clearly in the charts. The reverse also occurs: following COMMA, spot crude prices have fallen, in many cases to levels below GSP. The anomalous conditions of early-1979 apart, refiners do not run crude entirely for the spot market. Spot supplies have to be seen as part of a larger total: marginal additions to supply for the purposes of balancing the slate or making up volumes. To this extent, the spot "profit" is misleading; under most circumstances it is, at best, a highly artificial convention.

8.12 The margins between GSP crude costs and spot product prices are even more artificial. Given the commitment of a refiner to his own distribution system, it is unlikely that he would have the opportunity to divert large volumes into the spot market at short notice, even if he wanted to. As the previous section has shown, main market prices were well below those obtainable on the spot market for most of the COMMA year so that the refiner's ex-refinery realisations were well below levels indicated by the GPW calculation based on spot prices.

8.13 The point made at the end of the previous section also applies to any assumed causal relationship between crude and product prices. Crude prices provide a cost floor, so that increases in crude costs will certainly push product prices up in the main market. Spot crude and product prices are amplified market signals of imbalances in supply and demand. It is significant that it is an unsymmetrical signal: spot crude prices will never fall as far below GSP as they are likely to go above it since they are constrained on the downside by the willingness of suppliers to the spot market - mostly refiners who have surpluses of crude bought at GSP - to take a loss. A notable development in the crude market during and before the COMMA year was willingness of producers to sell crude spot, in order to take advantage of the premium available; as spot prices have fallen back, they have for the most part withdrawn, leaving the spot market much as it was before mid-1978. There is no conclusive evidence that these movements are causally linked to spot products prices. The conclusion that they may be is, however, plausible - particularly given the recent tendency of producers to rationalise crude price increases on these grounds. But this implies that producers need objective market evidence for their pricing decisons, which is not borne out by history: producers have raised prices when the market is slack, ignoring signals from the spot market when it has suited them. It is more convincing to suggest that the crude and product markets, economically linked but separate, are both subject to and respond to the same influences. Signals from the spot markets, crude and products, are a manifestation of these influences, not a cause.

CHART 8.1

GROSS PRODUCT WORTH AND CRUDE COSTS

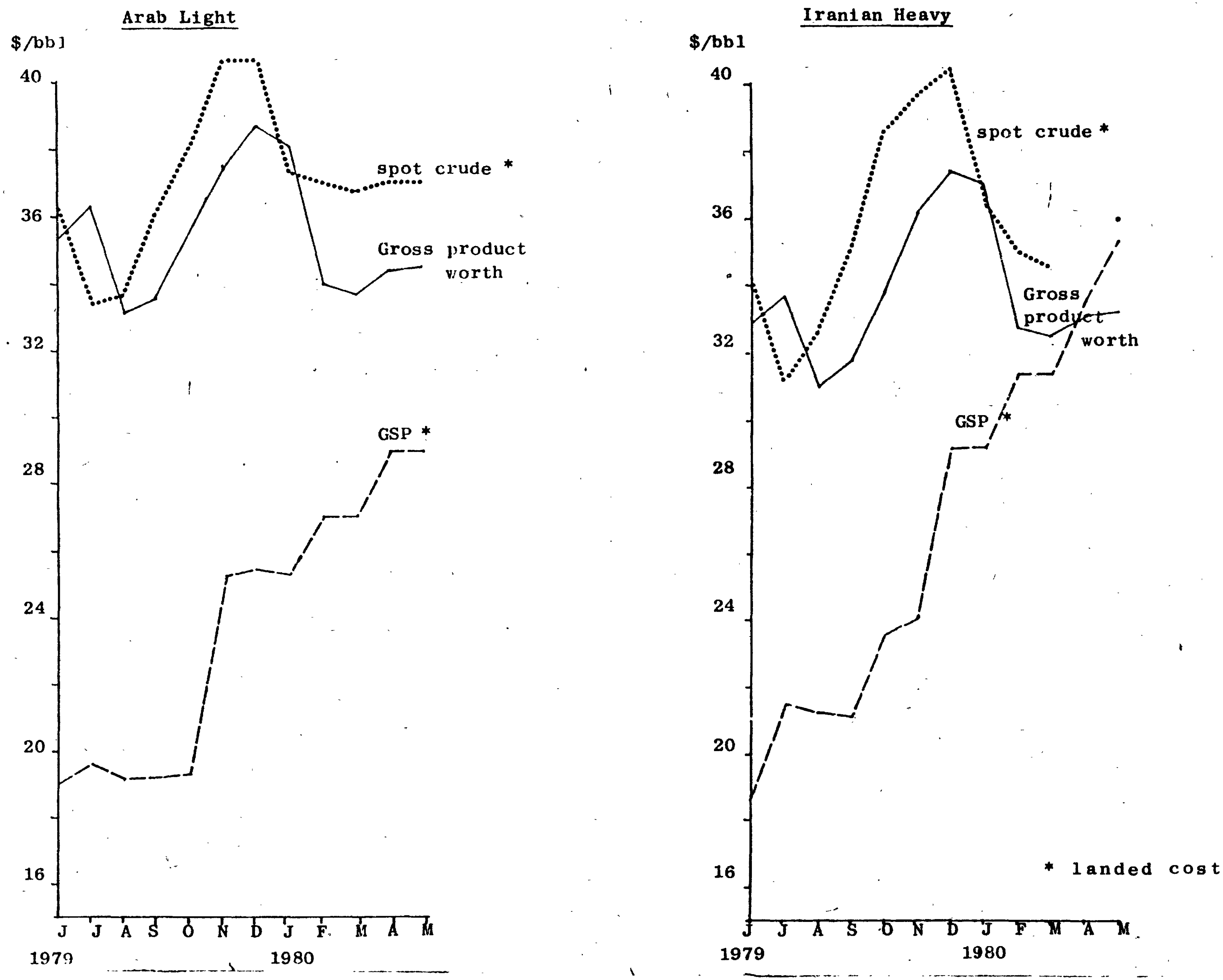
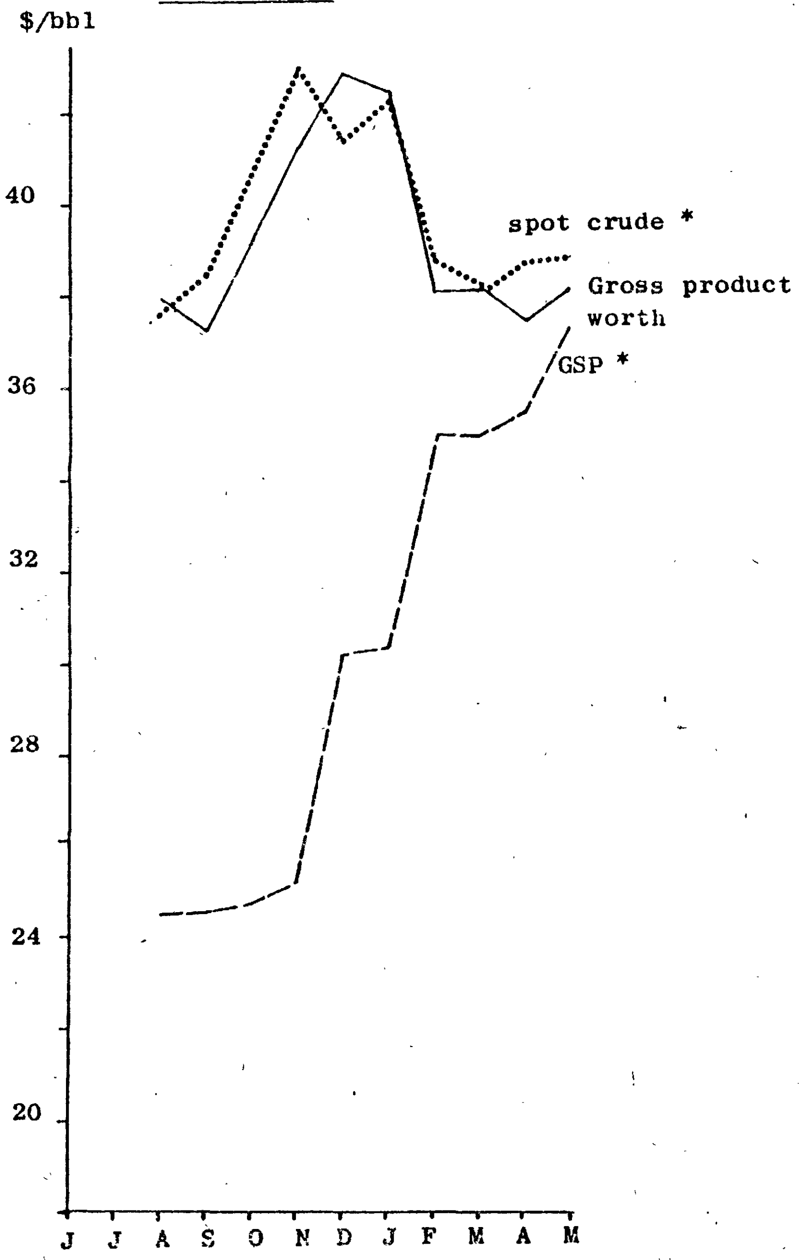


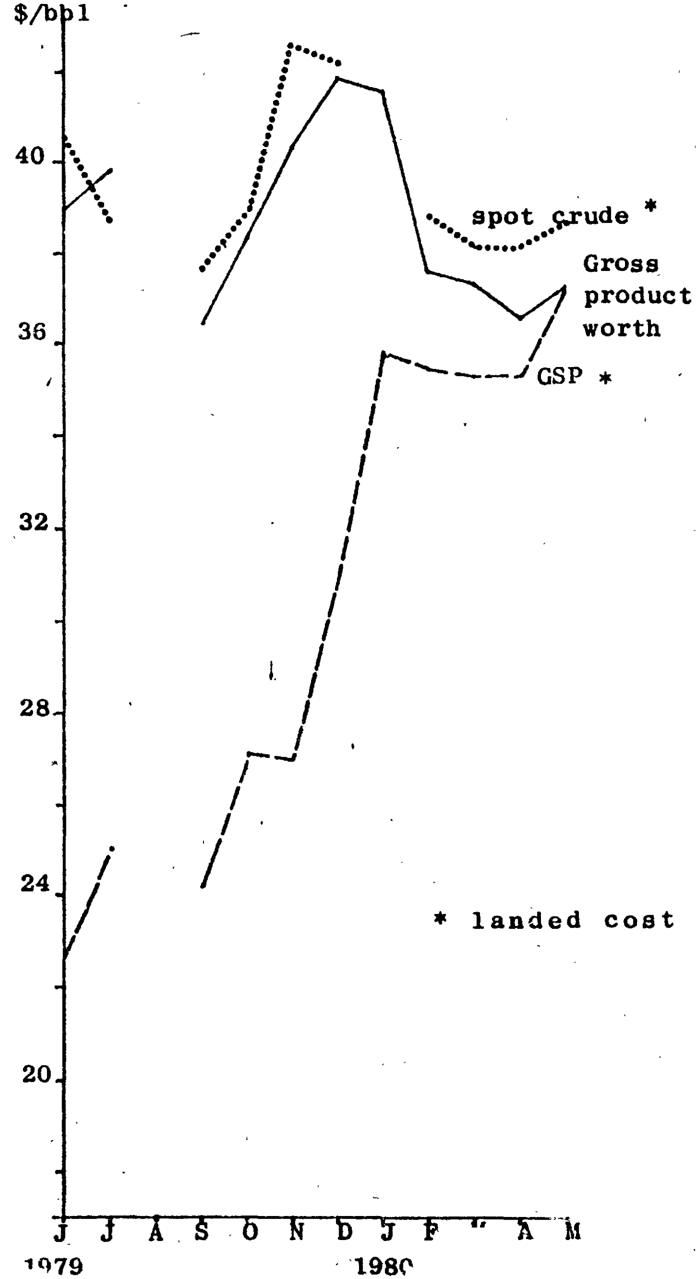
CHART 8.2

GROSS PRODUCT WORTH AND CRUDE COSTS

Bonny Light



Zuetina



ANNEXES

Joe Roeber Associates

TABLE A.2.1

TOTAL PRODUCTS SUPPLY FOR ELEVEN EUROPEAN COUNTRIES 1979

Million tonnes

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	LUXEMBOURG	U K	IRELAND	DENMARK	SWEDEN	SWITZERLAND
NET PRODUCTION (a)	108.7	119.5	108.7	57.2	32.7	-	90.6	2.2	8.5	15.4	4.4
IMPORTS	36.0	11.7	7.1	25.8	9.2	1.3	12.0	4.1	8.8	15.9	8.7
- of which, from (other) EEC	23.8	6.0	1.0	10.4	5.5 e	1.3	8.0	3.6	5.7	7.4	6.3
EXPORTS	6.7	16.0	22.5	44.0	15.3	-	13.0	0.1	1.9	3.5	-
- of which, to (other) EEC	3.7	8.9	9.4	35.2	11.8 e	-	9.3	0.1	0.2	2.8	-
NET IMPORTS /(EXPORTS)	29.3	(4.3)	(15.4)	(18.2)	(6.0)	1.3	(1.0)	4.0	6.9	12.4	8.7
CONSUMPTION (b)	132.2	103.0	89.3	29.0	24.7	1.2	81.5	5.8	14.7	26.2	12.0

Notes: a) Net of refinery fuel and backflows to refineries

b) Observed inland deliveries: excludes international marine bunkers, aviation fuel and stock changes

e estimate

Source: Quarterly Oil Statistics OECD, 1980 No 1

TABLE A.2.2

MOGAS SUPPLY FOR ELEVEN EUROPEAN COUNTRIES 1979

Million tonnes

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	LUXEMBOURG	U K	IRELAND	DENMARK	SWEDEN	SWITZERLAND
NET PRODUCTION (a)	20.48	19.02	16.82	7.60	5.16	-	16.11	0.52	1.45	2.46	0.99
IMPORTS	3.04	0.35	0.24	2.01	0.85	0.28	2.15	0.47	0.74	1.64	1.64
- of which, from (other) EEC (c)	2.46	0.35	0.15	0.95	0.85[e]	0.28	2.01	0.47	0.55	1.47	1.60
EXPORTS	0.78	1.83	5.08	6.73	2.95	-	0.92	-	0.54	0.47	-
- of which, to (other) EEC (c)	0.10	0.89	2.42	4.51	1.77[e]	-	0.83	-	0.02	0.32	-
NET IMPORTS/(EXPORTS)	2.26	(1.48)	(4.84)	(4.72)	(2.09)	0.28	1.23	0.47	0.21	1.17	1.64
CONSUMPTION (b)	23.73	17.70	12.24	3.52	3.07	0.28	18.69	0.98	1.67	3.64	2.59

Notes: a) Net of backflows to refineries
b) Observed inland deliveries, excludes stock changes
c) Total gasoline trade. Figures only slightly higher than Mogas trade
e estimate

Source: Quarterly Oil Statistics OECD, 1980 No 1

TABLE A.2.3

NAPHTHA SUPPLY FOR ELEVEN EUROPEAN COUNTRIES 1979

Million tonnes

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	LUXEMBOURG	U K	IRELAND	DENMARK	SWEDEN	SWITZERLAND
NET PRODUCTION (a)	4.21	3.73	4.68	4.11	2.04	-	5.24	0.01	0.09	0.01	0.02
IMPORTS	4.46	2.21	1.22	8.93	0.71	-	1.92	0.11	0.05	1.01	0.07
- of which, from (other) EEC	3.16	2.21	0.04	2.61	0.38[e]	-	0.50	0.11	0.04	0.66	0.07
EXPORTS	0.88	0.84	1.91	5.28	1.06	-	0.65	-	0.04	-	-
- of which, to (other) EEC	0.84	0.74	1.43	4.99	1.06[e]	-	0.50	-	0.01	-	-
NET IMPORTS/(EXPORTS)	3.58	1.37	(o.69)	3.65	(0.35)	-	1.27	0.11	0.01	1.01	0.07
CONSUMPTION (b)	6.55	6.15	5.71	6.58	1.53	-	4.79	0.12	0.09	1.07	0.09

Notes: a) Net of backflows to refineries
b) Observed inland deliveries, excludes stock changes
e estimate

Source: Quarterly Oil Statistics OECD, 1980 No 1

TABLE A.2.4

GAS/DIESEL OIL SUPPLY FOR ELEVEN EUROPEAN COUNTRIES 1979

Million tonnes

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	LUXEMBOURG	U K	IRELAND	DENMARK	SWEDEN	SWITZERLAND
NET PRODUCTION (a)	46.26	43.78	30.35	19.85	11.53	-	25.45	0.61	3.62	5.29	1.97
IMPORTS	19.03	1.98	0.92	7.00	3.92	0.60	1.02	0.84	3.78	4.93	5.45
- of which, from (other) EEC	12.64	1.22	0.34	2.50	1.92 e	0.60	0.41	0.75	2.53	2.18	3.24
EXPORTS	0.96	4.11	6.37	16.53	5.28	0.01	5.05	-	0.82	0.63	-
- of which, to (other) EEC	0.35	1.80	2.75	13.44	3.90 e	0.01	3.89	-	0.06	0.43	-
NET IMPORTS/(EXPORTS)	18.07	(2.13)	(5.45)	(9.53)	(1.36)	0.59	(4.02)	0.84	2.97	4.30	5.45
CONSUMPTION (b)	63.26	39.66	24.45	7.84	9.89	0.57	19.87	1.35	6.60	9.24	7.08

Notes: a) Net of refinery fuel and backflows to refineries

b) Observed inland deliveries, excludes international marine bunkers and stock changes

e estimate Source: Quarterly Oil Statistics OECD, 1980 No 1

TABLE A.2.5

HEAVY FUEL OIL (RESIDUAL) SUPPLY FOR ELEVEN EUROPEAN COUNTRIES 1979

Million tonnes

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	LUXEMBOURG	U K	IRELAND	DENMARK	SWEDEN	SWITZERLAND
NET PRODUCTION (a)	22.15	37.59	44.97	18.70	10.42	-	28.60	1.06	2.89	6.56	0.92
IMPORTS	4.01	4.57	4.34	4.34	2.51	0.33	5.56	1.92	2.91	7.17	0.58
- of which, from (other) EEC	2.43	1.63	0.45	2.50	2.16 e	0.33	3.94	1.58	1.55	2.42	0.42
EXPORTS	1.63	6.02	5.23	8.69	3.52	0.02	3.64	0.09	0.35	2.01	0.02
- of which, to (other) EEC	0.79	4.02	1.82	7.22	3.31 e	0.02	2.74	0.09	0.11	1.77	-
NET IMPORTS/(EXPORTS)	2.37	(1.45)	(0.89)	(4.35)	(1.01)	0.32	1.92	1.83	2.56	5.17	0.56
CONSUMPTION (b)	22.48	29.24	40.01	6.74	7.92	0.31	27.51	2.88	5.39	10.57	1.49

Notes: a) Net of refinery fuel and backflows to refineries

b) Observed inland deliveries, excludes international marine bunkers and stock changes

e estimate Source: Quarterly Oil Statistics OECD, 1980 No 1

TABLE A.2.6

TOTAL PRODUCTS INLAND DELIVERIES FOR NINE EUROPEAN COUNTRIES: QUARTERLY, JUNE 1979 - MAY 1980

Million tonnes
(Index: Quarterly average = 100)

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	U K	IRELAND	DENMARK	SWEDEN	TOTAL 9 COUNTRIES
June - August 1979	33.3 (102)	20.1 (80)	17.7 (81)	6.4 (93)	4.6 (80)	18.6 (95)	1.4 (94)	2.7 (77)	5.8 (96)	110.5 (90)
September - November 1979	34.5 (106)	25.6 (102)	23.5 (107)	7.1 (102)	5.9 (103)	20.9 (106)	1.5 (107)	3.4 (99)	5.8 (96)	128.3 (104)
December 1979 - February 1980	31.9 (98)	29.8 (119)	24.5 (112)	7.1 (104)	6.5 (113)	20.8 (105)	1.5 (104)	4.2 (120)	6.6 (110)	132.8 (108)
March - May 1980	30.7[a] (94)	25.0 (100)	22.0[a] (100)	6.9[e] (101)[e]	6.0[a] (104)	18.5 (94)	1.4[a] (95)	3.6[a] (104)	5.9[e] (98)[e]	120.0 (98)

Notes: a) Data for two months only: May deliveries estimated
e estimate

Sources: Eurostat: Hydrocarbons Monthly Bulletin;
Oil & Energy Trends, Energy Economics Research Ltd.

TABLE A.2.7

MOGAS INLAND DELIVERIES FOR NINE EUROPEAN COUNTRIES: QUARTERLY, JUNE 1979 - MAY 1980

Million tonnes
(Index: Quarterly average = 100)

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	U K	IRELAND	DENMARK	SWEDEN	TOTAL 9 COUNTRIES
June - August 1979	6.19 (103)	4.96 (111)	3.41 (111)	1.02 (103)	0.82 (105)	4.92 (104)	0.26 (103)	0.44 (110)	1.02 (118)	23.04 (107)
September - November 1979	6.11 (101)	4.45 (100)	2.98 (98)	1.01 (101)	0.83 (105)	4.83 (102)	0.25 (100)	0.41 (102)	0.87 (101)	21.74 (101)
December 1979 - February 1980	5.59 (93)	3.99 (90)	2.80 (92)	0.98 (99)	0.75 (96)	4.45 (94)	0.24 (98)	0.37 (92)	0.76 (89)	19.93 (92)
March - May 1980	6.21 (103)	4.42 (99)	3.04 (100)	0.97[a] (97)	0.74[a] (94)	4.71[a] (100)	0.24[a] (98)	0.39[a] (97)	0.79[e] (92)	21.51 (100)

Notes: a) Data for two months only: May deliveries estimated
e estimate

Sources: Eurostat: Hydrocarbons Monthly Bulletin
Oil & Energy Trends, Energy Economics Research Ltd.

TABLE A.2.8

GAS/DIESEL OIL INLAND DELIVERIES FOR NINE EUROPEAN COUNTRIES:

QUARTERLY, JUNE 1979 - MAY 1980

Million tonnes
(Index: Quarterly average = 100)

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	U K	IRELAND	DENMARK	SWEDEN	TOTAL 9 COUNTRIES
June - August 1979	15.48 (101)	5.93 (63)	3.87 (66)	1.26 (81)	1.45 (63)	3.84 (81)	0.26 (80)	1.02 (67)	1.42 (62)	34.53 (80)
September - November 1979	16.20 (106)	8.88 (94)	6.72 (114)	1.65 (105)	2.45 (107)	4.88 (104)	0.38 (118)	1.38 (90)	2.09 (91)	44.63 (103)
December 1979 - February 1980	15.29 (99)	13.48 (143)	7.69 (131)	1.80 (115)	2.96 (129)	5.42 (115)	0.36 (111)	1.99 (130)	3.09 (134)	52.08 (120)
March - May 1980	14.31 (93)	9.39 (100)	5.28 (90)	1.55[a] (99)	2.31[a] (101)	4.73[a] (100)	0.29[a] (91)	1.71[a] (112)	2.59• (112)•	42.16 (97)

Notes: a) Data for two months only: May deliveries estimated
• estimate

Sources: Eurostat: Hydrocarbons Monthly Bulletin
Oil & Energy Trends, Energy Economics Research Ltd.

TABLE A.2.9

HEAVY FUEL OIL (RESIDUAL) INLAND DELIVERIES FOR NINE EUROPEAN COUNTRIES

QUARTERLY, JUNE 1979 - MAY 1980

Million tonnes
(Index: Quarterly average = 100)

	FRG	FRANCE	ITALY	NETHERLANDS	BELGIUM	U K	IRELAND	DENMARK	SWEDEN	TOTAL 9 COUNTRIES
June - August 1979	4.82 (90)	4.80 (71)	7.01 (76)	1.43 (96)	1.39 (75)	5.19 (88)	0.64 (93)	0.80 (69)	3.20 (120)	29.28 (84)
September - November 1979	5.70 (106)	7.72 (115)	9.97 (109)	1.55 (104)	1.85 (101)	6.44 (109)	0.72 (105)	1.18 (102)	2.73 (102)	37.86 (108)
December 1979 - February 1980	5.82 (109)	7.85 (116)	10.30 (112)	1.73 (116)	2.07 (113)	6.60 (112)	0.72 (104)	1.47 (127)	2.57 (96)	39.13 (112)
March - May 1980	5.11 (95)	6.59 (98)	9.40 (103)	1.28[a] (85)	2.04[a] (111)	5.32[a] (90)	0.67[a] (98)	1.19[a] (102)	2.18• (82)•	33.78 (96)

Notes: a) Data for two months only: May deliveries estimated
• estimate

Sources: Eurostat: Hydrocarbons Monthly Bulletin
Oil & Energy Trends, Energy Economics Research Ltd

TABLE A.3.1

COMMA VOLUMES AND NUMBERS OF TRANSACTIONS REPORTED (JUNE 1979 - MAY 1980)

NWE CARGOES

	June-Aug.		Sept-Nov.		Dec-Feb.		Mar-May		Year	
	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT
PREMIUM MOGAS										
Total[1]	28	333.8	28	389.1	22	308.4	18	150.7	96	1181.9
Valid[2]	27	315.8	28	389.1	21	286.8	18	150.7	94	1142.4
Per cent[3]	11	8	10	7	9	7	7	4	9	6
REGULAR MOGAS										
Total	7	29.9	7	28.8	6	65.8	10	68.3	30	192.8
Valid	5	28.5	6	28.0	6	65.8	10	68.3	27	190.6
Per cent	2	1	2	1	3	2	4	2	3	1
NAPHTHA										
Total	58	1037.5	68	1479.2	64	1134.2	82	1409.4	272	5060.3
Valid	55	927.4	65	1352.2	60	999.2	81	1395.4	261	4674.2
Per cent	23	25	23	25	25	24	31	33	25	26
GASOIL										
Total	87	820.9	83	1540.0	77	1208.0	76	1079.2	323	4648.1
Valid	82	813.9	77	1412.7	72	1140.1	73	1031.2	304	4397.9
Per cent	34	22	27	26	30	27	28	24	30	25
MAX. 1% FUEL OIL										
Total	30	596.4	44	973.8	36	721.9	36	740.9	146	3033.1
Valid	25	479.0	42	933.8	33	676.6	30	592.8	130	2682.2
Per cent	10	13	15	17	14	16	12	14	13	15
MAX. 2% FUEL OIL										
Total	11	309.3	11	312.2	4	96.0	10	232.1	36	949.6
Valid	9	223.8	8	194.4	4	96.0	10	232.1	31	746.3
Per cent	4	6	3	4	2	2	4	6	3	4
MAX. 3.5% FUEL OIL										
Total	42	1011.6	69	1468.0	46	1088.0	43	992.2	200	4559.8
Valid	40	962.3	60	1203.0	41	985.0	38	787.2	179	3937.5
Per cent	17	26	21	22	17	23	15	19	17	22
OVER 3.5% FUEL OIL										
Total	6	165.5	4	97.5	10	231.6	16	299.4	36	794.0
Valid	0	0	0	0	0	0	0	0	0	0
Per cent	0	0	0	0	0	0	0	0	0	0
TOTAL FUEL OILS										
Total	89	2082.8	128	2851.5	96	2137.5	105	2264.7	418	9336.4
Valid	74	1665.1	110	2331.2	78	1757.6	78	1612.1	340	7366.0
Per cent	31	45	39	42	33	41	30	38	33	41
TOTAL										
Total	269	4304.9	314	6288.6	265	4853.8	291	4972.3	1139	20419.5
Valid	243	3750.7	286	5513.1	237	4249.5	262	4257.7	1026	17771.0
Per cent	100	100	100	100	100	100	100	100	100	100

1) Total reported to KKC
2) Valid transactions
3) Valid transactions as per cent of valid transactions for all products.

TABLE A.3.2

COMMA VOLUMES AND NUMBERS OF TRANSACTIONS REPORTED (JUNE 1979 - MAY 1980)

NWE BARGES

	June-Aug.		Sept-Nov.		Dec-Feb.		Mar-May		Year	
	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT
PREMIUM MOGAS										
Total[1]	104	269.0	137	285.6	89	177.2	127	257.1	457	988.9
Valid[2]	101	259.4	135	283.7	89	177.2	127	257.1	452	977.4
Per cent[3]	8	10	8	8	5	5	7	7	7	7
REGULAR MOGAS										
Total	23	33.3	40	67.3	28	50.2	47	93.6	138	244.4
Valid	23	33.3	39	66.7	28	50.2	47	93.6	137	243.8
Per cent	2	1	2	2	2	.1	3	3	2	2
NAPHTHA										
Total	24	132.6	31	172.9	45	285.7	56	395.0	156	986.1
Valid	23	127.6	23	124.1	40	278.8	55	391.5	141	921.1
Per cent	2	5	1	4	3	8	3	11	2	7
GASOIL										
Total	1019	1659.7	1337	2369.2	1053	1976.8	1443	2227.5	4852	8233.2
Valid	967	1572.0	1302	2295.4	1047	1970.1	1430	2203.3	4746	8040.8
Per cent	76	62	78	66	67	56	76	61	74	61
MAX. 1% FUEL OIL										
Total	66	208.5	98	384.2	164	489.1	142	392.6	470	1474.2
Valid	66	202.5	93	371.6	163	485.1	140	390.5	460	1449.5
Per cent	5	8	6	10	10	14	8	11	7	11
MAX. 2% FUEL OIL										
Total	20	70.8	46	184.8	133	277.2	47	165.8	246	698.6
Valid	16	56.0	37	166.1	133	277.2	45	155.8	231	655.1
Per cent	1	2	2	5	9	8	2	4	4	5
MAX. 3.5% FUEL OIL										
Total	83	274.6	54	190.0	73	306.2	35	110.7	245	881.4
Valid	82	274.3	52	185.5	71	303.9	28	98.0	233	861.6
Per cent	6	11	3	5	5	9	2	3	4	7
OVER 3.5% FUEL OIL										
Total	9	34.0	7	23.0	29	81.4	30	93.3	75	231.7
Valid	0	0	0	0	0	0	0	0	0	0
Per cent	0	0	0	0	0	0	0	0	0	0
TOTAL FUEL OILS										
Total	178	587.8	205	781.9	399	1153.8	254	762.3	1036	3285.8
Valid	162	532.7	182	723.1	367	1066.2	213	644.2	924	2966.2
Per cent	13	21	11	20	23	30	11	18	14	23
TOTAL										
Total	1348	2683.4	1750	3676.9	1614	3643.8	1927	3735.6	6639	13738.5
Valid	1278	2525.1	1681	3492.9	1571	3541.6	1872	3589.8	6400	13149.3
Per cent	100	100	100	100	100	100	100	100	100	100

1) Total reported to KKC
2) Valid transactions
3) Valid transactions as per cent of valid transactions for all products.

TABLE A.3.3

COMMA VOLUMES AND NUMBERS OF TRANSACTIONS REPORTED (JUNE 1979 - MAY 1980)

MED FOB

	June-Aug. No	June-Aug. '000 MT	Sept-Nov. No	Sept-Nov. '000 MT	Dec-Feb. No	Dec-Feb. '000 MT	Mar-May No	Mar-May '000 MT	Year No	Year '000 MT
PREMIUM MOGAS										
Total(1)	12	165.4	10	180.8	13	223.5	10	200.3	45	769.9
Valid(2)	12	165.4	10	180.8	12	198.5	10	200.3	44	744.9
Per cent(3)	13	10	13	12	20	21	26	30	17	16
REGULAR MOGAS										
Total	3	37.1	6	85.3	1	19.4	3	28.5	13	170.3
Valid	3	37.1	5	84.5	1	19.4	3	28.5	12	169.5
Per cent	3	2	7	6	2	2	8	4	5	4
NAPHTHA										
Total	12	196.6	6	140.9	2	57.0	1	2.3	21	396.7
Valid	12	196.6	6	140.9	0	0	1	2.3	19	339.7
Per cent	13	12	8	10	0	0	3	0.3	7	7
GASOIL										
Total	29	460.0	28	474.5	26	286.7	12	176.9	95	1398.1
Valid	29	460.0	28	474.5	26	286.7	10	165.6	93	1386.8
Per cent	32	29	37	32	43	31	26	25	35	30
MAX. 0.5% FUEL OIL										
Total	3	38.0	3	52.0	1	35.0	0	0	7	125.0
Valid	3	38.0	3	52.0	1	35.0	0	0	7	125.0
Per cent	3	2	4	4	2	4	0	0	3	3
MAX. 1% FUEL OIL										
Total	5	100.5	7	136.0	6	111.0	4	80.5	22	428.0
Valid	4	70.5	7	136.0	6	111.0	4	80.5	21	398.0
Per cent	4	4	9	9	10	12	10	12	8	9
MAX. 2% FUEL OIL										
Total	4	92.0	1	15.0	2	58.0	1	24.0	8	189.0
Valid	4	92.0	1	15.0	2	58.0	1	24.0	8	189.0
Per cent	4	6	1	1	3	6	3	4	3	4
MAX. 3.5% FUEL OIL										
Total	23	535.9	17	418.9	12	220.7	10	174.7	62	1350.2
Valid	23	535.9	16	398.9	12	220.7	10	174.7	61	1330.2
Per cent	26	34	21	27	20	24	26	26	23	28
OVER 3.5% FUEL OIL										
Total	11	291.5	6	201.5	7	150.4	7	111.5	31	754.9
Valid	0	0	0	0	0	0	0	0	0	0
Per cent	0	0	0	0	0	0	0	0	0	0
TOTAL FUEL OILS										
Total	46	1057.9	34	823.4	28	575.1	22	390.7	130	2847.2
Valid	34	736.4	27	621.9	21	424.7	15	279.2	97	2042.2
Per cent	38	46	36	41	35	46	39	41	37	33
TOTAL										
Total	102	1916.9	84	1704.9	70	1161.8	48	798.6	304	5582.2
Valid	90	1595.5	76	1482.6	60	929.3	39	675.8	265	4683.2
Per cent	100	100	100	100	100	100	100	100	100	100

1) Total reported to KKC
2) Valid transactions
3) Valid transactions as per cent of valid transactions for all products.

TABLE A.3.4

COMMA VOLUMES AND NUMBERS OF TRANSACTIONS REPORTED JUNE 1979 - MAY 1980)

MED CIF

	June-Aug. No	June-Aug. '000 MT	Sept-Nov No	Sept-Nov '000 MT	Dec-Feb No	Dec-Feb '000 MT	Mar-May No	Mar-May '000 MT	Year No	Year '000 MT
PREMIUM MOGAS										
Total(1)	2	36.0	1	18.0	2	40.5	2	18.0	7	112.5
Valid(2)	1	18.0	1	18.0	2	40.5	2	18.0	6	94.5
Per cent(3)	2	2	2	1	2	2	3	1	2	1
REGULAR MOGAS										
Total	0	0	0	0	0	0	0	0	0	0
Valid	0	0	0	0	0	0	0	0	0	0
Per cent	0	0	0	0	0	0	0	0	0	0
NAPHTHA										
Total	13	243.0	13	287.6	15	305.0	8	130.3	49	965.9
Valid	12	215.5	13	287.6	15	305.0	8	130.3	48	938.4
Per cent	25	20	21	18	14	11	11	6	16	12
GASOIL										
Total	20	392.7	32	641.9	43	979.2	20	437.2	115	2450.9
Valid	19	374.7	32	641.9	41	944.2	20	437.2	112	2397.9
Per cent	39	34	52	40	39	34	25	21	38	32
MAX 0.5% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Valid	0	0	0	0	0	0	0	0	0	0
Per cent	0	0	0	0	0	0	0	0	0	0
MAX 1% FUEL OIL										
Total	2	56.0	1	19.0	0	0	3	90.5	6	165.5
Valid	2	56.0	1	19.0	0	0	3	90.5	6	165.5
Per cent	4	5	2	1	0	0	4	4	2	2
MAX 2% FUEL OIL										
Total	0	0	1	62.0	0	0	4	135.9	5	197.9
Valid	0	0	1	62.0	0	0	4	135.9	5	197.9
Per cent	0	0	2	4	0	0	5	7	2	3
MAX 3.5% FUEL OIL										
Total	16	442.6	14	583.8	48	1481.9	45	1551.5	123	4059.7
Valid	15	433.6	14	583.8	48	1481.9	41	1266.5	118	3765.7
Per cent	31	40	23	36	45	54	52	61	40	50
OVER 3.5% FUEL OIL										
Total	2	45.7	2	35.1	2	74.5	8	275.0	14	430.3
Valid	0	0	0	0	0	0	0	0	0	0
Per cent	0	0	0	0	0	0	0	0	0	0
TOTAL FUEL OILS										
Total	20	544.3	18	699.9	50	1556.4	60	2052.9	148	4853.5
Valid	17	489.6	16	664.8	48	1481.9	48	1492.9	129	4129.1
Per cent	53	45	26	41	45	54	60	72	44	55
TOTAL										
Total	55	1216.0	64	1647.4	110	2881.1	90	2638.4	319	8382.8
Valid	49	1097.7	62	1612.3	106	2771.6	78	2078.4	295	7560.0
Per cent	100	100	100	100	100	100	100	100	100	100

1) Total reported to KKC
2) Valid transactions
3) Valid transactions as per cent of valid transactions for all products.

TABLE A.3.5

COMMA TRADE* FOR ALL PRODUCTS: by month

('000 tonnes)

	NWE			MED			
	Cargoes	Barges	Total	FOB	CIF	Total	Grand Total
1979							
June	1122	907	2029	412	223	635	2664
July	1125	719	1844	680	231	911	2755
August	1504	899	2403	504	644	1148	3551
September	1910	951	2861	525	450	975	3836
October	1673	765	2438	452	676	1128	3566
November	1930	1776	3706	506	486	992	4698
December	963	821	1784	297	609	906	2690
1980							
January	1382	1013	2395	310	1132	1442	3837
February	1905	1708	3613	323	1031	1354	4967
March	1061	758	1819	237	586	823	2642
April	1648	1424	3072	253	519	772	3844
May	1549	1408	2957	187	974	1161	4118
Total	17772	13149	30921	4686	7561	12247	43168

* Valid transactions

TABLE A.4.1

PREMIUM MOGAS; QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT - NWE CARGOES

Per cent of total valid transactions by weight

Lead Content g/1		SPECIFIC GRAVITY									
From	To less than	Less than 0.735	0.735 0.740	0.740 0.745	0.745 0.750	0.750 0.755	0.755 0.760	0.760 0.765	0.765 and above	Not Reported	TOTAL
0.45 and above				1.7	3.8	5.9	2.2	4.7	1.7	5.8	25.7
0.40	0.45		1.7	2.0	10.1	21.8	4.1	3.7	0.2		43.7
0.35	0.40		1.8								1.8
0.20	0.35										0.0
0.15	0.20		0.9			1.2	0.5	4.0	9.3	0.6	16.5
Less than	0.15			1.7							1.7
Not reported					1.9	1.2		0.7	0.9	6.0	10.6
TOTAL		0.0	4.4	5.4	15.7	30.1	6.9	13.1	12.0	12.4	100.0

TABLE A.4.2

PREMIUM MOGAS; QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT - NWE BARGES

Per cent of total valid transactions by weight

Lead Content g/l		SPECIFIC GRAVITY									
From	To less than	Less than 0.735	0.735 0.740	0.740 0.745	0.745 0.750	0.750 0.755	0.755 0.760	0.760 0.765	0.765 and above	Not Reported	TOTAL
0.45 and above					0.2	0.6	0.6	2.2			3.6
0.40	0.45	0.4	0.3	1.7	4.4	5.2	3.1	2.5	1.4	5.1	24.0
0.35	0.40			1.8							1.8
0.30	0.35			0.3							0.3
0.20	0.30										0.0
0.15	0.20		0.2	0.9	10.2	4.0	1.9	24.2	6.5	11.4	59.1
Less than	0.15				1.1	1.0	0.1				2.1
Not reported				0.8		0.3	0.3	1.1	1.1	5.4	9.0
TOTAL		0.4	0.5	5.5	15.9	11.0	5.9	29.9	9.0	21.8	100.0

TABLE A.4.3

PREMIUM MOGAS: QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT - MEDITERRANEAN CIF

Per cent of total valid transactions by weight

Lead Content g/l From	To Less than	SPECIFIC GRAVITY Less than 0.750	0.750 - 0.755	0.755 - 0.760	0.760 - 0.765	0.765 and above	Not Reported	TOTAL
0.45 and above			20.1	22.8	19.0	14.3		76.2
0.40	0.45				19.0			19.0
Less than 0.40								0.0
Not reported						4.8		4.8
TOTAL		0.0	20.1	22.8	38.1	19.1	0.0	100.0

TABLE A.4.4

PREMIUM MOGAS: QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT - MEDITERRANEAN FOB

Per cent of total valid transactions by weight

Lead content g/l From	To less than	SPECIFIC GRAVITY less than 0.735	0.735 - 0.740	0.740 - 0.745	0.745 - 0.750	0.750 - 0.755	0.755 - 0.760	0.760 - 0.765	0.765 and above	Not Reported	TOTAL
0.45 and above		0.9				6.0		2.7		2.7	12.2
0.40	0.45		3.0	12.2	11.7	26.0	18.5	6.2	0.7		78.3
0.20	0.40										0.0
0.15	0.20				3.4						3.4
Less than 0.15											0.0
Not Reported				2.4		3.8					6.2
TOTAL		0.9	3.0	14.5	15.0	35.8	18.5	8.8	0.7	2.7	100.0

TABLE A.4.5

REGULAR MOGAS: QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT - NWE CARGOES

Per cent of total valid transactions by weight

Lead Content g/l		SPECIFIC GRAVITY								Not Reported	TOTAL
From	To less than	Less than 0.735	0.735 0.740	0.740 0.745	0.745 0.750	0.750 0.755	0.755 0.760	0.760 0.765	0.765 and above		
0.45 and above			2.1		2.7	1.6		5.2	1.3		13.0
0.40	0.45	2.6	2.6					8.9		3.9	18.1
0.20	0.40										0.0
0.15	0.20	8.7	4.8		7.9	4.5		5.2			31.1
Less than 0.15											0.0
Not reported		3.2				5.3				29.4	37.8
TOTAL		14.5	9.6	0.0	10.6	11.3	0.0	19.4	1.3	33.4	100.0

TABLE A.4.6

REGULAR MOGAS: QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT - NWE BARGES

Per cent of total valid transactions by weight

Lead Content g/1		SPECIFIC GRAVITY								
From	To Less than	Less than 0.735	0.735 0.740	0.740 0.745	0.745 0.750	0.750 0.755	0.755 0.760	0.760 and above	Not Reported	TOTAL
0.45 and above									0.8	0.8
0.40	0.45	0.8	1.2	0.6	1.3	8.6			1.4	14.0
0.35	0.40									0.0
0.30	0.35					1.6				1.6
0.20	0.30									0.0
0.15	0.20	0.7	41.1	2.1	23.5	2.1	1.2		9.7	80.3
Less than	0.15		0.9							0.9
Not reported		0.4		0.9					1.0	2.3
TOTAL		2.0	43.2	3.6	24.8	12.3	1.2	0.0	13.0	100.0

TABLE A.4.7

REGULAR MOGAS: QUALITY SORTING BY SPECIFIC GRAVITY AND LEAD CONTENT – MEDITERRANEAN FOB

Per cent of total valid transactions by weight

Lead content g/l From	To Less than	SPECIFIC GRAVITY less than 0.735	0.735 0.745	0.745 0.750	0.750 0.755	0.755 0.765	0.765 and above	Not Reported	TOTAL
0.45 and above		10.9		44.2	8.9		10.6		74.6
0.40	0.45	11.8							11.8
0.25	0.40								0.0
0.20	0.25	2.4							2.4
Less than	0.20								0.0
Not reported		11.3							11.3
TOTAL		36.3	0.0	44.2	8.9	0.0	10.6	0.0	100.0

TABLE A.4.8

NAPHTHA: QUALITY SORTING BY PARAFFINIC CONTENT FOR NWE CARGOES AND BARGES AND MEDITERRANEAN FOB AND CIF

Per cent of total valid transactions by weight in reporting region

REPORTING REGION	PARAFFINIC CONTENT % From / To less than	Less than 50	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75	75 – 80	80 and over	NOT REPORTED	TOTAL
NWE Cargoes			1.4	5.2	13.6	23.1	17.6	10.0	11.3	17.7	100.0
NWE Barges			0.2	1.6	15.2	25.3	12.0	5.5	15.8	24.4	100.0
Mediterranean FOB						15.7	58.0	8.8	6.5	10.9	100.0
Mediterranean CIF				10.5	8.9	24.7	28.2	10.2	9.3	8.3	100.0

TABLE A.4.9

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT – NWE CARGOES

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY Less than 0.830	0.830 – 0.835	0.835 – 0.840	0.840 – 0.845	0.845 – 0.850	0.850 – 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above		1.8	3.8	4.7	3.9	0.9	1.2	3.2	3.2	22.7
0.5	0.6		0.7	1.6	4.3	11.8	1.6	1.0	1.6	22.6
0.4	0.5					0.9	0.1		0.8	1.8
0.3	0.4	1.4	2.0	2.1	5.7	11.1	18.0	2.2	0.6	43.0
0.2	0.3	0.6	1.2	0.3	0.5			0.2		2.7
Less than 0.2										0.0
Not reported		1.7	0.2	1.1	1.3	1.2	0.2		1.4	7.2
TOTAL		5.5	7.9	9.8	15.6	26.0	21.0	6.6	7.6	100.0

TABLE A.4.10

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT - NWE BARGES

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY Less than 0.830	0.830 – 0.835	0.835 – 0.840	0.840 – 0.845	0.845 – 0.850	0.850 – 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above		0.2	0.2	0.8	0.3	0.6	0.1	0.1		2.3
0.5	0.6	0.3	0.7	2.3	2.2	10.1	0.8		1.5	17.8
0.4	0.5		0.2	0.1	0.5	2.3	0.8		0.1	4.0
0.3	0.4	1.5	2.7	3.7	6.4	43.4	2.3	0.7	7.8	68.4
0.2	0.3				0.1	0.1				0.3
0.1	0.2	0.1								0.1
Less than 0.1										0.0
Not Reported		0.1	2.7	0.5	0.9	1.9	0.2		0.9	7.2
TOTAL		2.2	6.4	7.4	10.5	58.5	4.1	0.8	10.2	100.0

TABLE A.4.11

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT - MEDITERRANEAN CIF

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt.		SPECIFIC GRAVITY								
From	To Less than	Less than 0.830	0.830 0.835	0.835 0.840	0.840 0.845	0.845 0.850	0.850 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above			2.9	4.3	4.5	16.2	12.8		1.3	41.9
0.5	0.6		0.8		3.6	11.2	6.8		0.6	22.9
0.4	0.5			2.6	0.1	0.8				3.6
0.3	0.4		0.6	3.3	3.6	8.9	2.5			18.9
0.2	0.3		0.8			1.3	1.2			3.3
0.1	0.2	0.8		1.2		0.8	1.0			3.8
Less than 0.1										0.0
Not Reported					0.9	1.3	2.3		1.0	5.6
TOTAL		0.8	5.1	11.4	12.7	40.4	26.7	0.0	2.9	100.0

TABLE A.4.12

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT - MEDITERRANEAN FOB

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY less than 0.830	0.830 0.835	0.835 0.840	0.840 0.845	0.845 0.850	0.850 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above				5.5	9.3	13.0	8.0	2.4		38.2
0.5	0.6	1.4		3.1	20.0	9.2	1.4			35.2
0.4	0.5									0.0
0.3	0.4	3.1		2.2	1.9		1.4			8.7
0.2	0.3						0.2			0.2
Less than 0.2										0.0
Not reported				2.0	1.9	4.8	3.5	0.8	4.8	17.8
TOTAL		4.5	0.0	12.8	33.2	27.1	14.5	3.2	4.8	100.0

TABLE A.4.13

FUEL OIL: QUALITY SORTING BY SULPHUR CONTENT FOR NWE CARGOES AND BARGES AND MEDITERRANEAN FOB AND CIF

Per cent of total valid transactions by weight in reporting region

REPORTING REGION	SULPHUR CONTENT % wt. From / To less than	Less than 0.6	0.6 / 1.1	1.1 / 1.6	1.6 / 2.1	2.1 / 2.6	2.6 / 3.1	3.1 / 3.6	TOTAL
NWE Cargoes		1.5	34.9	2.6	7.5	3.1	6.6	43.8	100.0
NWE Barges		4.6	44.3	0.3	21.8	2.1	9.6	17.4	100.0
Mediterranean FOB		6.1	19.5		9.3		18.8	46.3	100.0
Mediterranean CIF			4.0		4.8	10.6	24.9	55.7	100.0

TABLE A.4.14

FUEL OIL: SORTING BY VISCOSITY FOR NWE CARGOES AND BARGES AND MEDITERRANEAN FOB AND CIF

Per cent of total valid transactions by weight in reporting region

REPORTING REGION	VISCOSITY secs. From / To less than	Less than 1000	1000 / 1500	1500 / 2000	2000 / 2500	2500 / 3000	3000 / 3500	3500 / 4000	4000 / 4500	4500 and above	Not Reported	TOTAL
NWE cargoes		4.9	2.1	5.4	1.0	1.1	1.6	35.6	2.3		46.0	100.0
NWE barges		1.1	0.5	1.2	0.9	0.4	7.3	22.1	0.6		66.1	100.0
Mediterranean FOB		4.4	0.9	2.2				43.7	3.9		44.9	100.0
Mediterranean CIF		4.8	1.3	10.6	5.7	4.0		29.4	5.5	1.2	37.6	100.0

TABLE A.5.1

QUOTATIONS LINKED TRANSACTIONS - NWE BARGES

	June-Aug.		Sept-Nov.		Dec-Feb.		Mar-May		Year	
	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT
PREMIUM MOGAS										
Total (1)	2	2.0	1	1.0	0	0	2	6.0	5	9.0
Per cent (2)		1		-		0		2		1
REGULAR MOGAS										
Total	1	1.5	1	1.0	0	0	2	1.0	4	3.5
Per cent		5		2		0		1		1
NAPHTHA										
Total	2	10.9	2	15.0	2	7.2	2	25.0	8	58.1
Per cent		9		12		3		6		6
GASOIL										
Total	0	0	1	3.0	1	5.0	3	11.0	5	19.0
Per cent		0		-		-		1		-
MAX. 1% FUEL OIL										
Total	0	0	1	20.0	6	54.0	3	25.0	10	99.0
Per cent		0		5		11		6		7
MAX. 2% FUEL OIL										
Total	0	0	4	95.0	0	0	0	0	4	95.0
Per cent		0		57		0		0		2
MAX. 3.5% FUEL OIL										
Total	1	20.0	0	0	12	109.0	0	0	13	129.0
Per cent		1		0		36		0		15
OVER 3.5% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
TOTAL FUEL OILS										
Total	1	20.0	5	115.0	18	163.0	3	25.0	27	323.0
Per cent		4		16		15		4		11
TOTAL										
Total	6	34.4	10	135.0	21	175.2	12	68.0	49	412.6
Per cent		1		4		5		2		3

1) Number and volume of otherwise valid transactions with quotations-linked prices.
2) As a percentage of total valid transactions.

TABLE A.5.2

QUOTATIONS LINKED TRANSACTIONS - NWE CARGOES

	June-Aug. No	June-Aug. '000 MT	Sept-Nov. No	Sept-Nov. '000 MT	Dec-Feb. No	Dec-Feb. '000 MT	Mar-May No	Mar-May '000 MT	Year No	Year '000 MT
PREMIUM MOGAS										
Total[1]	2	7.0	2	18.4	2	40.0	0	0	6	65.4
Per cent[2]		2		5		14		0		6
REGULAR MOGAS										
Total	1	3.0	0	0	1	12.0	1	8.5	3	23.5
Per cent		11		0		18		12		12
NAPHTHA										
Total	5	117.5	10	217.3	7	91.0	13	194.0	35	619.8
Per cent		13		16		9		14		13
GASOIL										
Total	15	114.1	11	255.0	1	15.0	2	45.0	29	429.1
Per cent		14		18		1		4		10
MAX. 1% FUEL OIL										
Total	3	68.0	6	245.0	1	25.0	1	19.0	11	357.0
Per cent		14		26		4		3		13
MAX. 2% FUEL OIL										
Total	0	0	0	0	0	0	1	27.5	1	27.5
Per cent		0		0		0		12		4
MAX. 3.5% FUEL OIL										
Total	2	42.5	8	151.7	4	83.0	2	37.0	16	314.2
Per cent		4		13		8		5		8
OVER 3.5% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
TOTAL FUEL OILS										
Total	5	110.5	14	396.7	5	108.0	4	83.5	28	698.7
Per cent		7		17		6		5		10
TOTAL										
Total	28	352.1	37	887.5	16	266.0	20	331.0	101	1836.5
Per cent		9		16		6		8		10

1) Number and volume of otherwise valid transactions with quotations-linked prices.
2) As a percentage of total valid transactions.

TABLE A.5.3

QUOTATIONS LINKED TRANSACTIONS - MED FOB

	June-Aug No	June-Aug '000 MT	Sept-Nov No	Sept-Nov '000 MT	Dec-Feb No	Dec-Feb '000 MT	Mar-May No	Mar-May '000 MT	Year No	Year '000 MT
PREMIUM MOGAS										
Total[1]	4	68.5	1	29.0	2	50.0	3	60.0	10	207.5
Per cent[2]		41		16		25		30		28
REGULAR MOGAS										
Total	0	0	1	20.0	0	0	0	0	1	20.0
Per cent		0		24		0		0		12
NAPHTHA										
Total	3	115.0	1	30.0	0	0	0	0	4	145.0
Per cent		59		21		0		0		43
GASOIL										
Total	8	98.5	11	192.0	6	75.3	3	57.3	28	423.1
Per cent		21		41		26		35		31
MAX. 0.5 FUEL OIL										
Total	0	0	1	20.0	0	0	0	0	1	20.0
Per cent		0		39		0		0		16
MAX 1% FUEL OIL										
Total	0	0	0	0	0	0	1	30.0	1	30.0
Per cent		0		0		0		37		8
MAX. 2% FUEL OIL										
Total	4	92.0	1	15.0	2	58.0	0	0	7	165.0
Per cent		100		100		100		0		87
MAX. 3.5% FUEL OIL										
Total	10	246.0	6	150.3	2	70.0	0	0	18	466.3
Per cent		46		38		3		0		35
OVER 3.5% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
TOTAL FUEL OILS										
Total	14	338.0	8	185.3	4	128.0	1	30.0	27	681.3
Per cent		46		31		30		11		34
TOTAL										
Total	29	620.0	22	456.3	12	253.3	7	147.3	70	1476.9
Per cent		39		31		22		22		32

1) Number and volume of otherwise valid transactions with quotations-linked prices.
2) As a percentage of total valid transactions.

TABLE A.5.4

QUOTATIONS LINKED TRANSACTIONS - MED CIF

	June-Aug.		Sept-Nov.		Dec-Feb		Mar-May		Year	
	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT	No	'000 MT
PREMIUM MOGAS										
Total[1]	0	0	0	0	0	0	0	0	0	0
Per cent[2]		0		0		0		0		0
REGULAR MOGAS										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
NAPHTHA										
Total	3	52.5	3	58.3	0	0	3	40.8	9	151.6
Per cent		24		20		0		31		16
GASOIL										
Total	3	51.0	8	158.5	2	29.7	5	31.6	18	270.8
Per cent		14		25		3		7		11
MAX. 0.5% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
MAX 1% FUEL OIL										
Total	0	0	1	19.0	0	0	0	0	1	19.0
Per cent		0		100		0		0		12
MAX. 2% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
MAX. 3.5% FUEL OIL										
Total	9	282.5	4	240.0	17	660.5	8	187.5	38	1370.5
Per cent		65		41		45		15		36
OVER 3.5% FUEL OIL										
Total	0	0	0	0	0	0	0	0	0	0
Per cent		0		0		0		0		0
TOTAL FUEL OILS										
Total	9	282.5	5	259.0	17	660.5	8	187.5	39	1389.5
Per cent		58		39		45		13		34
TOTAL										
Total	15	386.0	16	475.8	19	690.2	16	259.9	66	1811.9
Per cent		35		30		25		13		24

1) Number and volume of otherwise valid transactions with quotations-linked prices.
2) As a percentage of total valid transactions.

TABLE A.5.5

LIST OF PARTICIPANTS IN THE EUROPEAN COMMISSION'S MARKET ANALYSIS (COMMA) AS AT 1ST NOVEMBER 1979

Company	Address	Contacts	Telex	Telephone
Allied Petroleum Limited	10 Gloucester Place London W1 H 3AX	Mr. H.J. Durels Mr. M.C. Lawrence	22602 allpet g	01-487-4301
Anro oil	Westblaak 6 3012 KK Rotterdam	Mr. W. Florek Mrs. I. Vinks	24527 anro nl	010-333711
API-Anonima Petroli Italiana s.p.a.	Corso d'Italia 6 Rome	Dr. Umberto Scarimboli Mr. Biagio Cinelli	680115 apioil i 610068 apioil i	direct 06-8441586 switchboard 06-8493
BASF	6700 Ludwigshafen	Mr. Hans Wallrabenstein Mr. Hilbert	464706 basf d	0621-607187 0621-6021939
Belgische Olie Maatschappij	Mazoutweg 10 2020 Antwerpen	Mr. Herman Engelen Mr. Francois Janssens	32503 bomhob b	031-377882
Bomin Heizöl GmbH	Königsallee 175 D-4630 Bochum	Mrs. D. Künzel Mr. A. Marquardt	825838 bmg d	0234-779247 0234-779221
Borra s.p.a.	Via Nino Bixio 4 Milan	Miss Eleonora Scarantino Mr. Boschi Guido	321306 borra i	02-221051
British Petroleum - Head Office	London	Mr. J.F. Rogers	888811 bpldn g	01-920-7441
- BP Belgium	Antwerp	Mr. Charles Perain Mr. Pierre de Win	31290 beepee b	031-287880
- BP Germany	Hamburg	Mr. W. Weller Mr. K. Stoerkel Mr. P. Schibany	217007441 bp d	040-635-2447 040-635-2617 040-635-2341
- BP Holland	Amsterdam	Mr. J.A. Verhage Mr. H. van Zwol	11430 bphk nl	020-5201385 020-5201309
- BP France	Courbevoie	Mr. H. Lejeune Mr. A F. Causton	620392 bepee f	01-3344851
- BP Oil (UK)	Victoriastreet London	Mr. C.C. Houseman Mr. J.G Mumford	8811151 bpoil g	01-821-3007 01-821-2768
- BP Denmark	Copenhagen	Mr. K. Rybner Mr. P. Wheadon	15022 bp dk	01-155455
- BP Trading (London)	London	Mr. D. Whalley Mr. C.R. Burn	888811 bpldn g	01-920-6646 01-920-6205

E A.5.5 cont.

LIST OF PARTICIPANTS IN THE EUROPEAN COMMISSION'S MARKET ANALYSIS (COMMA) AS AT 1ST NOVEMBER 1979

Company	Adress	Contacts	Telex	Telephone
Bulk Oil				
- Bulk Oil (Rotterdam) B.V.	Statenweg 200 Rotterdam	Mr. J.G. Klootwijk Mr. W.A.R.M. Peek	24018 bulk nl 24632 27422	010-659200 ext. 13 131-133
- Bulk Oil (Germany) GmbH	Leinpfad 94a P.O Box 605249 2000 Hamburg 60	Mr. Hans Unbehaun Mrs. Genilde Hopp	212791 bulkg d	040-477031
Cameli and Co s.p.a.	Via Roma 1 Genova	Mr. Giorgio Vassallo Mr. Francesco Delagarda	270030 cameli i	010-567161
Chevron Oil Europe	Southside 105 Victoriastreet London SW 1	Mr. R.F. Udall Mr. J.W. Krumbeck	912913 chevic g	01-8289733
Coe and Clerici s.p.a.	Via Martin Piaggio 17 Genova	Mr. A.T. Goar Mr. E. Brenta	270680 cocler i 271311	010-54891
Compagni Française des Petroles (Total)	Paris	Mr. J.F. Chopitel Mr. A. Defressigne	611992 total f 620641 tote f	01-5244646 ext. 22 01-7439840 ext. 3
Continental Oil Co Ltd	105 Wigmore Street London WIH OEL	Mr. G.F. Lawson Mr. R.W. Petchey	22564 cocluk g	01-4931235
Defrol GmbH	Essen	Mr. Harald W. Etterich Mr. K. Gude/Mr. M.Pasing	8579811 dfr d	0201-192219 0201-192278
DOW Chemical Europe	Weena 116 Postbus 1310 Rotterdam	Mr. W.G. Horn	22292 dowr nl	010-143011
DSM	P O.Box 65 Heerlen	Mr. G Duyfjes Mr. J. Werker	56018 dsm nl	045-782096
Elf/Erap	7 Rue Nelaton Paris-Cedex 15	Mr. J.F. Kirsch Mr. P. Jochyms	203607 elfa f	01-5717968 01-5718358
Enel	Via G.B. Martini 3 00198 Roma	Mr. Marco Gatti Mr. Giuseppe Musti	610518 eneldg i	06-85092682 06-85092545

TABLE A.5.5 cont.

LIST OF PARTICIPANTS IN THE EUROPEAN COMMISSION'S MARKET ANALYSIS (COMMA) AS AT 1ST NOVEMBER 1979

Company	Address	Contacts	Telex	Telephone
ENI - Agip Petroli s.p.a.	Via Laurentina 449 Rome 00142	Mr. M. Prezzi Mr. C. Andronico Mr. M. Angeletti	613521 agipes i	06-59981
- Agip Nederland B.V.	Callandstraat 66 Rotterdam	Mr. S. Moretti	23440 agip nl	010-363900
Esso Europe	London	Mr. R. Rijneveldt Mr. J. Clifford	21221 essoeu g	01-4937030 ext. 3
European Oil Partners	Coolsingel 75 3012 AD Rotterdam	Mr. Robert Mos	26429 eoprt nl	010-122830
Frisol Handelsmaatschappij	Buiten Walenvest 4 Postbus 170 3300 AD DORDRECHT	Hr. Goud	29454 frio nl	078-135166
Garrone s.p.a.	Genoa	Mr. Piergiorgio Minas Mr. Mario Pertica Miss Giuli Mondini	270245 garr i	010-56381
Gulf Oil Company	Boompjes 55 Rotterdam	Mr. A. Verbrugge Mr. J.H. Vernie	21234 gulf nl	010-140511
Imperial Chemical Industries Ltd (ICI)	P.O. Box 90 Wilton Middlesbrough Cleveland	Mr. R B. Walker Mr. J. McLean	58522 icipeh g	0642-455522
Industria Italiana Petroli s.p.a. (Inpetrol)	Piazza della Vittoria 1 16121 Genoa	Mr. Peter O'Brien Mrs. Paola Podesta Mr. Gianluigi Brancaccio	270107 ipge i	010-5994422 010-5994758 010-5994328
Interol B.V.	Gorinchem	Mr. K. Plieger Mr. A. Roza	23494 andel nl	01830-31166 01830-30155
I.O.C.	41 Avenue Montaigne 75008 Paris	Mr. M. Cailhol Mr. I. Scott	461921 zenith f	01-720-9333
ISAB	Genoa	Mr. D. d'Arpizio Mr. G. Poggi	271058 isab i	010-581941 010-589841 010-543455
John Hudson & Co.	8 Maltravers Street London WC 2R 3EE	Mr. J.B. Dawes Mr. Windavis	22459 hudson g	09-44-1-8364433

TABLE A.5.5 cont.

LIST OF PARTICIPANTS IN THE EUROPEAN COMMISSION'S MARKET ANALYSIS (COMMA) AS AT 1ST NOVEMBER 1979

Company	Address	Contacts	Telex	Telephone
Mabanaft GmbH	Kattrepelsbrücke 1 2000 Hamburg 1	Mr. Brunke Mr. Koehler Mr. Eisenhardt	2161451 mft d	040-339741
Mercator Holland B.V.	Blaak 31 3011 GA Rotterdam	Mr. Los	23706 merca nl	010-121830
Mobil Oil	New York	Mr. C.N. Maravell (spae) Mr. E.B. Congleton (spae) Mr. L.E. Mahanger (csad) Mr. J.H. Beardsley (mprs)	232561 mob ur	212-8834242 ext 212-8834242 ext
	London	Mr. A.W. John	267210 moblds g	1-8317171 ext 40
Monsanto Europe S.A.	270-272 Avenue de Tervuren 1150 Bruxelles	Mr. J.E. Kuhns Mr. G.M. Francx	62927 mesa b	2-7621112
Montedison	L.go G. Donegani 1-2 Milan	Dr. Fiorillo	310679 monted i	2-62702296
Nedol B.V./Gebr. Broere B.V.	Dordrecht	Mr. R.J.F. Meiring Mr. P.J. Hornberg	29178 nedol nl	078-182022
North Sea Petroleum B.V.	Heresingel 1 Groningen	Mr. Cor Brongers Mr. Wim Wanders	53617 north nl	050-124943
Petra European Trading Company B.V.	Van Vollenhovenstr.10 Rotterdam	Mr. H. Koehler Miss C.P.F. van Rijt Mr. R. Groeneveld	24410 petra nl	010-365566
Petromer S.A.	Chaussee de la Hulpe 130 bte 6 b-1050 Bruxelles	Miss Sonia Orfin Mr. Jan Driessen	21982 romer b	2-6604970
Petronor	Avda.Generalisimo 61 Madrid 16	Mr. J.C. Barrientos Mr. J.M. Vazquez	22221 norpe e	1-2709153 (direct 1-2796105 ext 30
Phillips Petroleum Company	Portland House, Stag Place London SW 1E 5 DA	Mr. J. Roussel Mr. H. Wardell	913101 philldn g	1-8289766

TABLE A.5.5 cont.

LIST OF PARTICIPANTS IN THE EUROPEAN COMMISSION'S MARKET ANALYSIS (COMMA) AS AT 1ST NOVEMBER 1979

Company	Address	Contacts	Telex	Telephone
Sakko B.V	Z.W. Singel 202 4611 KH Bergen op Zoom	Mr. W. van den Boom Mr. P. Verhage	54492 sakko nl	01640-36945
Sanguirico	Via Gesu 8 Milan	Mr. Roberto Bertola Mr. Guiliano Tavazzani	311379 sanco i	2-791155/6/7 2-706683 2-793611
Saras s.p.a. (Raffinerie Sarole)	Galleria de Cristo- foris 8 Milan 20122	Mr. G. de Cristofaro Mr. A. Faro Mr. E. Virno	311273 saras i	2-7737
Shell	Karel v. Bijlandtln.30 Den Haag	Mr. C.I. Hubert Mr. C.C. Wagner	31353 shell nl 31005 shell nl	070-773577 070-773223
S.I.R. Consorzio Industrial s.p.a.	Via Grazioli 33 Milan	Mr. George Benedetti Mr. Sante Tomasello	330513 sirci i	2-64092750 2-64092920
V.d. Sluijs Handelsmaatschappij B.V.	Centraleweg 42 Geertruidenberg	Mr. R. Hartsuiker Mr. J. Noordermeer	54535 sluijs nl	01621-3900
Tampimex Oel GmbH	Postfach 200 280 Hamburg	Mr. Rainer Robe Mrs Annie Schlieker	215377 tamex d	40-483941 40-485251
Texaco Europe/S.A. Texaco Belgium N.V.	149 Avenue Louise 1050 Bruxelles	Mr. G. Devriendt (report) Mr. D.K. Chopra) (technquest) Dr. P. Vokuhk (	22629 texbs b	2-5388010
Transito Petroleum B.V.	Postbus 160 3350 AD Papendrecht	Mr. Van Wijnen Mr. Visser	29384 jvp nl	078-151400
Transol B.V.	Ringdijk 420 2983 GS Slikkerveer	Mr. W.F. Onderdijk Mr. R. van 't Oost Mr. A. Groen	20120 otra nl	010-297755
Union Kraftstoff Wesseling	Ludwigshafener Strasse PO Box 8 Wesseling	Mr. Hansen Mr. Hochscherff	8886947 ukw d	2236-792297 2236-792652
Urbaine des petroles	23 Rue Galileé 75016 Paris	Mr. R. Lavoir Mr. P. Morley	611092 urbaine f	1-7237242
Veba A.G.	Carl Arnoldplatz 3 Düsseldorf	Dr. Siedentopf Mr. Kantelberg	8585554 veba d	0211-4579280 0211-4579356
Wintershall	Friedrich Ebert - strasse 160 3500 Kassel	Mr. G. Winter Mr. H. Werner	99632 wint d	0561-301-462 0561-301-261

TABLE A.5.6

COMMA PARTICIPANTS BY GROUPS

GROUP 1: REFINERS	Checkrun Participants
British Petroleum	x
Chevron Oil Europe	x
Total	x
Elf/Erap	x
Esso Europe	x
Gulf Oil Company	x
Mobil	x
Phillips Petroleum Company	x
Shell	x
Texaxo Europe	x
Veba	x
Italian;	
API - Anonima Petroli Italiana s.p.a.	x
ENI	
Garrone s.p.a.	
Inpetrol	
ISAB	
Sanguirico	
Saras s.p.a.	
S.I.R. Consorzio Industrial s.p.a.	x

GROUP 2: MARKETERS	
Allied Petroleum Ltd.	x
BASF	x
DOW Chemical Europe	x
Imperial Chemical Industries	x
Interol B.V.	x
Nedol BV/Gebr Groere BV	
North Sea Petroleum BV	
Petronor	
Transito Petroleum BV	
Union Kraftstoff Wesseling	x
Wintershall	x
Italian:	
Cameli and Co s.p.a.	
Montedison	

TABLE A.5.6 cont.

COMMA PARTICIPANTS BY GROUPS

GROUP 3: TRADER MARKETERS	Checkrun Participants
Belgische Olie Maatschappij	x
Bamin Heizol GmBH	
Borra s.p.a.	
Defrol GmBH	
DSM	x
IOC	x
John Hudson & Co.	x
Mercator Holland BV	
Monsanto Europe S.A.	
Petromer S.A.	
Sakko	
V.d. Sluijs Handelsmaatschappij BV	
Urbaine des Petroles	x
Italian;	
Enel	x

GROUP 4: WHOLESALE TRADERS	
Anro Oil	x
Bulk Oil (Germany) GmBH	
Mabanaft GmBH	
Petra European Trading Co. BV	x
Tampimex Oel und Transport GmBH	

GROUP 5: INTERNATIONAL TRADERS	
Bulk Oil	x
European Oil Partners	x
Italian;	
Coe and Clerici s.p.a.	

TABLE A.5.7

REPORTS BY CATEGORY OF PARTICIPANT

TOTAL PRODUCTS - NWE BARGES

Per cent of total tonnage production

Categories	1	2	3	4	5
%					
1979					
June	44	9	9	28	10
July	32	16	16	31	5
August	34	8	22	28	8
September	42	9	17	28	3
October	40	14	21	25	0
November	35	7	21	29	6
December	41	15	13	30	1
1980					
January	40	13	17	29	1
February	31	8	19	41	1
March	23	19	20	36	1
April	24	13	18	35	9
May	20	11	18	43	8
Total year					
- %	33	11	18	33	5
- thousand tonnes	4363	1455	2382	4331	616

TABLE A.5.8

REPORTS BY CATEGORY OF PARTICIPANT

TOTAL PRODUCTS - NWE CARGOES

Per cent of total tonnage production

Categories	1	2	3	4	5
%					
1979					
June	66	4	14	15	1
July	63	5	11	18	2
August	53	12	20	15	1
September	44	15	19	18	3
October	54	19	12	15	0
November	43	13	22	20	2
December	57	10	11	22	0
1980					
January	52	9	11	23	5
February	51	4	17	27	1
March	51	5	20	21	3
April	47	6	12	33	2
May	58	8	21	12	2
Total year					
- %	52	10	16	20	2
- thousand tonnes	9256	1714	2892	3562	345

TABLE A.5.9

REPORTS BY CATEGORY OF PARTICIPANT

GASOIL - NWE BARGES

Per cent of total tonnage production

Categories	1	2	3	4	5
%					
1979					
June	33	10	10	38	9
July	27	18	17	33	5
August	20	8	28	33	12
September	33	10	20	32	5
October	31	16	27	26	0
November	21	9	30	31	8
December	23	16	24	37	0
1980					
January	28	14	24	32	1
February	20	8	27	43	1
March	15	10	28	46	1
April	16	12	24	37	12
May	11	9	29	38	13
Total year					
- %	22	11	25	36	6
- thousand tonnes	1782	895	1998	2857	507

TABLE A.5.10

REPORTS BY CATEGORY OF PARTICIPANT

GASOIL - NWE CARGOES

Per cent of total tonnage production

Categories	1	2	3	4	5
%					
1979					
June	36	1	13	46	3
July	78	0	7	7	8
August	44	0	30	22	3
September	42	34	14	5	5
October	38	18	22	21	0
November	21	14	38	27	0
December	39	19	11	31	0
1980					
January	50	9	9	30	2
February	49	4	0	42	5
March	63	0	2	34	0
April	48	5	19	28	1
May	57	0	20	20	3
Total year					
- %	45	10	17	26	2
- thousand tonnes	1980	439	732	1137	107

TABLE A.5.11

NWE CARGO TRADE BY REPORTING AREA *

	June-Aug '000 MT	No	Sept-Nov. '000 MT	No	Dec-Feb '000 MT	No	Mar-May '000 MT	No	COMMA Year '000 MT	No
PREMIUM MOGAS										
NWE	235.2	18	303.9	22	137.9	13	71.2	12	748.2	65
ARA	54.6	5	144.5	8			13.2	2	212.3	15
UK	140.6	10	59.0	6	112.0	10	40.2	8	351.8	34
REGULAR MOGAS										
NWE	5.5	2	10.0	2	24.0	2	30.2	6	69.7	12
ARA			10.0	2			5.0	2	15.0	4
UK							2.2	2	2.2	2
NAPHTHA										
NWE	693.1	43	1078.9	53	749.6	45	1093.0	62	3614.6	203
ARA	466.4	29	927.8	44	565.3	34	764.0	45	2723.5	152
UK	99.9	6					67.0	5	166.9	11
HAVRE	11.0	2							11.0	2
GASOIL										
NWE	551.2	52	793.9	47	1098.2	70	938.2	68	3381.5	237
ARA	409.4	23	585.4	33	369.0	23	557.5	32	1921.3	111
UK	87.8	24	76.0	7	218.2	21	133.0	14	515.0	66
HAVRE			50.5	2	40.2	2			90.7	4
MAX. 1% FUEL OIL										
NWE	224.0	12	472.0	26	414.4	20	426.9	21	1537.3	79
ARA	52.5	2	180.6	8	50.0	2	164.0	7	447.1	19
UK	127.5	7	191.2	10	133.9	6	151.5	6	604.1	29
MAX. 2% FUEL OIL										
NWE	80.3	3	-		23.0	2	134.4	4	237.7	9
ARA					23.0	2	84.4	2	107.4	4
UK	40.3	2					50.0	2	90.3	4
MAX. 3.5% FUEL OIL										
NWE	767.3	31	986.7	49	852.0	34	706.0	33	3312.0	147
ARA	272.5	12	228.0	17	230.5	11	92.0	4	823.0	44
UK	222.3	9	597.9	24	278.0	9	211.5	11	1309.7	53
HAVRE			46.0	2	90.0	3	77.5	2	213.5	7
TOTAL										
NWE	2556.6	161	3645.4	199	3299.1	186	3399.9	206	12901.0	752
ARA	1255.4	71	2076.3	112	1237.8	72	1680.1	94	6249.6	349
UK	718.4	58	924.1	47	742.1	46	655.4	48	3040.0	199
HAVRE	11.0	2	96.5	4	130.2	5	77.5	2	315.2	13

* Unadjusted for late reporting and not including quotations-linked transactions.

TABLE A.6.1.1

WEIGHTED AVERAGE PRICES, NWE, MONTHLY

$ per tonne

	June	July	August	September	October	November	December	January	February	March	April	May
Cargoes												
Premium Mogas	-	367.94	353.51	343.61	355.59	361.05	-	369.22		-	345.15	-
CPM		-	(14.43)	(9.90)	11.98	5.46		-			-	
Regular Mogas	-	-	-	-	-	-	-	-	-	-	335.88	-
CPM												
Naphtha	328.24	349.55	339.41	321.20	336.39	366.89	392.65	391.68	349.25	343.86	335.47	321.76
CPM		21.31	(10.14)	(18.21)	15.19	30.50	25.76	(0.97)	(42.43)	(5.39)	(8.39)	(13.71)
Gasoil	365.04	350.49	318.33	330.26	332.05	359.18	356.29	352.17	309.73	299.37	314.27	315.39
CPM		(14.55)	(32.16)	11.93	1.79	27.13	(2.89)	(4.12)	(42.44)	(10.36)	14.90	1.12
max.1% fuel oil	159.84	159.55	161.45	162.28	177.18	-	214.09	201.24	177.64	186.74	182.31	185.36
CPM		(0.29)	1.90	0.83	14.90		-	(12.85)	(23.60)	9.10	(4.43)	3.05
max.2% fuel oil	-	-	146.92	-	-	-	-	-	-	-	-	-
CPM			-									
max.3.5% fuel oil	132.48	141.56	139.84	142.60	157.74	175.13	177.70	170.96	148.88	144.64	158.70	156.71
CPM		9.08	(1.72)	2.76	15.14	17.39	2.57	(6.74)	(22.08)	(4.24)	14.06	(1.99)
Barges												
Premium Mogas	395.77	387.13	359.18	341.77	353.51	382.79	413.32	419.63	388.30	384.70	365.73	381.17
CPM		(8.64)	(27.95)	(17.41)	11.74	29.28	30.53	6.31	(31.33)	(3.60)	(18.97)	15.44
Regular Mogas	385.36	378.71	-	343.00	350.15	373.22	400.50	411.56	374.48	379.18	356.69	373.92
CPM		(6.65)		-	7.15	23.07	27.28	11.06	(37.08)	(4.70)	(22,49)	17.23
Naphtha	335.36	-	327.41	325.76	-	-	393.95	395.83	348.84	342.84	339.25	322.45
CPM			-	(1.65)			-	1.88	(46.99)	(6.00)	(3.59)	(16.80)
Gasoil	354.95	371.46	320.44	329.11	330.34	358.96	353.47	343.36	308.45	294.22	323.21	330.13
CPM		16.51	(51.02)	8.67	1.23	28.62	(5.49)	(10.11)	(34.91)	(14.23)	28.99	6.92
max.1% fuel oil	157.14	156.63	156.57	165.16	173.81	186.27	209.66	202.70	183.86	190.10	180.37	186.84
CPM		(0.51)	(0.06)	8.59	8.65	12.46	23.39	(6.96)	(18.84)	6.24	(9.73)	6.47
max.2% fuel oil	139.36	150.71	143.75	-	163.41	185.72	195.67	182.50	165.50	166.99	156.95	171.03
CPM		11.35	(6.96)		-	22.31	9.95	(13.17)	(17.0)	1.49	(10.04)	14.08
max.3.5% fuel oil	135.95	142.56	139.10	141.77	156.07	165.58	179.31	171.45	149.69	143.18	163.81	158.52
CPM		6.61	(3.46)	2.67	14.30	9.51	13.73	(7.86)	(21.76)	(6.51)	20.63	(5.29)

CPM = change over previous month

ANNEX 7 - METHODOLOGY OF STATISTICAL PRICE ANALYSIS: SUMMARY

1. Single Series analysis

This is a computation of the autocorrelation function of price differences, i.e. week to week changes in price. Autocorrelation at lag k is

$$r_k = \frac{\displaystyle\sum_{t=1}^{n-k+1} \frac{(x_{t+k} - \bar{x})(x_t - \bar{x})}{n-k}}{\displaystyle\frac{\Sigma(x_t - \bar{x})^2}{n-1}}$$

where $x_t = P_t - P_{t-1}$

P_t = price at week t

The objective is to discover whether the week to week price changes are random or not. As a rule if $|r_1|$ is greater than $\frac{2}{\sqrt{v}}$ where v is the number of degrees of freedom then the price changes are not random and knowledge of P_t and P_{t-1} will allow a better estimate of P_{t+1} to be made. If the series of changes was random P_t would be the best estimate of P_{t+1}.

An additional objective is that the structure of the published series and the structure of the COMMA series can be compared.

2. Pairwise Series Analysis

Two series are compared, generally a COMMA series and a published series. Two sets of statistics are computed, a cross-correlation of price changes using the full set of data available and a set of moving cross-correlations considering only 13 weeks at a time, with the initial week being moved one week at a time.

The cross-correlation at lag k is

$$r_{kk} = \frac{\dfrac{\Sigma(x_{t+k} - \bar{x})(y_t - \bar{y})}{n - |k|}}{\sqrt{\dfrac{\Sigma(x_t - \bar{x})^2 . \Sigma(y_t - \bar{y})^2}{(n-1)^2}}}$$

where $x_t = P_t - P_{t-1}$ and $y_t = Q_t - Q_{t-1}$ and P_t and Q_t are weekly prices.

In the analyses the first series was the COMMA, the second was the published series, on this basis for a cross correlation function such as r_{-2} r_{-1} r_{00} r_{+1} r_{+2}, a significant value of r_k for $k > 0$ implies a correlation between COMMA change at t+k and published change at t, i.e. that the published changes influence subsequent COMMA changes. A significant value of r_k for $k < 0$ implies that COMMA changes lead published changes.

The conclusions can only be drawn if both sets of price changes have been shown to be random by their autocorrelation function. If this is not the case then further work must be carried out - prewhitening of the series.

In the simplest case this means taking

$$x_t - \emptyset x_{t-1}$$

instead of the weekly change x_t, if the autocorrelation at lag 1 is $r_1 = \emptyset$, in the computation of the cross correlation function.

Other statistics are produced measuring the similarity of published and COMMA series, these are: the mean deviation which is the overall average difference between the two price series; the root mean square error which is a measure of the dispersion of the published series about the COMMA series; the root mean square percentage error which measures the dispersion as a proportion of the first series (the published series). i.e. P_t = Published price C_t = COMMA price mean deviation $= \frac{1}{n} \sum_{t=1}^{n} (P_t - C_t)$

Root mean square error $= \sqrt{\frac{1}{n} \Sigma (P_t - C_t)^2}$

Root mean square % error $= 100 \sqrt{\frac{1}{n} \Sigma \left(\frac{P_t - C_t}{P_t} \right)^2}$

3. Analysis of Bounds

If the published prices reflect the market from which the COMMA prices are sampled, the high and low published prices should span a large proportion 90-95% of COMMA prices and this proportion should be consistent from week to week. To test this the probabilities of getting prices above or below the published high or low prices are computed using the assumption that prices within a week will be Normally distributed about some mean. This means that

$$\frac{c_t}{s_{c_t}}$$ is distributed as a Student's t random variable

with v degrees of freedom where s_{c_t} is the standard deviation of prices c_t within the week and there are n observations within the week and $v = n-1$.

4. Product Content Analysis

The objective is to discover the effect of various constituents of the fuel on prices if any and to discover whether the effect of specific gravity - a deterministic effect - is fully reflected in the prices.

The different prices within a week are considered, the high and low prices being the observations, the weighted average price being the 'base' line. The hypothesis being that departures from this base line in price were caused by departures in SG or constituent content from their weighted average values. In some cases when a value for constituent content was not available for the weighted average then an average of the high and low values was used instead.

The analyses were carried out using both variables singly (if there were two) and together. The equations are all of this form

$$\text{Reported price} = \beta_1 \frac{W_t.\text{Av.S.G}}{\text{Act.S.G}} \text{ Wt.Av. Price} + \beta_2(\text{Constituent Content} - \text{Wt.Av. Const. Content}) + \text{Error term}$$

Thus for each week there are two observations of the reported price, the high and the low. β_1 will be of the order of 1 and departures from 1 indicate possibly an inefficiency in the market's use of the SG information. β_2 will be a measure of the value of the particular constituent. β_1 when it appears will always be significant because the weighted average price explains so much variation in the prices, whereas β_2 will only be significant if the constituent content affects prices. Note that when SG is not used as an explanatory variable the equation becomes

$$\text{Reported price} - \text{Wt Av Price} = \beta_2(\text{Constituent content} - \text{Wt Av Constituent Content})$$

PREMIUM MOGAS BARGES

1. Single Series Analysis

(i) Midpoint of Platts - correlation at lag 1 significant probably autoregressive series (.4828 > 2 x .1414)

(ii) Midpoint of Pet. Argus - corrlation at lag 1 just significant probably autoregressive series (.2999 > 2 x .1414)

(iii) Midpoint of AFM - no significant autocorrelations - value at lag 1 was .2407 ($\not>$ 2 x .1414)

(iv) COMMA unadjusted weighted average - no significant autocorrelations.

(v) COMMA SG adjusted weighted average - no significant autocorrelations.

The COMMA series both exhibit random week to week changes and AFM exhibits the same behaviour. Platts and Petroleum Argus weekly price changes are correlated.

2. Pairwise Analysis

(i) Platts vs COMMA unadjusted - significant values at -1 and 0 in the full cross correlation. The moving cross correlation shows a changing pattern. The correlation at lag 0 is consistently significant although it varies in magnitude. The correlation at lag -1 starts insignificant and becomes significant for the 13 week period starting in week 43 (22+21 since week 1 = week 23) it stays significant for the rest of the data but appears to be decreasing in magnitude.

(ii) Petroleum Argus vs COMMA unadusted - significant values at +1 and 0 in the full cross correlation. In the moving cross correlation the correlation at lag 0 is occasionally non-significant initially becomes significant and positive and remains so. The correlation at lag -1 is significantly negative initially and becomes significantly positive. The correlation at lag +1 is initially positive and significant but ceases to be significant around week 37 (the period following this week).

(iii) AFM is COMMA unadjusted - The coincident correlation is fairly high (.607 with v=36), the correlation at lag +1 (.3407) is barely significant, at -1 the correlation is not.

In the moving cross correlation, at lag 0 the correlations start significant decline to insignificance around week 41 for 8 weeks, the correlation at lag -1 becomes significant about lag 43 for about 12 weeks, the correlation at lag +1 becomes significant in about week 5.

(iv) (v) and (vi) Repeat vs COMMA SG adjusted - similar behaviour to above.

3. Analysis of Bounds

(i) Platts: The average probability of a price occurring outside the Platts bounds is 39.6%. The picture from week to week is very volatile with probabilities of over or underestimation being of very unequal sizes, this is because the weighted average falls outside the Platts bounds.

(ii) Petroleum Argus: Average probability of falling outside bounds is 61.9%.

(iii) AFM: Average probability of falling outside bounds is 64.5%.

The same ranking is demonstrated by the following measures

	COMMA unadjusted			COMMA SG Adjusted		
	Platts	Pet Arg	AFM	Platts	Pet Arg	AFM
Mean Deviation	1.098	1.998	3.79	3.226	4.135	5.664
Root Mean Square Error	6.767	10.240	10.775	8.115	11.519	12.905
RM % SE	1.694	2.613	2.791	2.064	2.955	3.386

4. Product Content Analysis

(i) Reported price = $\underset{(.0129)}{.9906}\left(\frac{\text{WASG}}{\text{Act SG}}\ \text{Wt Av Price}\right) +$

$$(-24.86)\,(\text{Lead content} - \text{Wt Av Pb}) + \varepsilon$$

(ii) Reported price = $\underset{(.0111)}{.9872}\left(\frac{\text{WASG}}{\text{Act SG}}\ \text{Wt Av Price}\right) + \varepsilon$

(iii) Reported price - Wt Av Price = $\underset{(22.22)}{-27.77}\ (\text{Lead content} - \text{Wt Av Pb}) + \varepsilon$

The figures in brackets show the standard errors of the coefficients. The coefficients for SG show that the market considers this factor well and the evidence suggests that the lead content does not have any statistically discernable effect on price.

Further comments

In the case of AFM there is no evidence of anything other than a coincident relationship. For Platts and Petroleum Argus the series are sufficiently autocorrelated to prevent any conclusions being drawn without prewhitening.

Prewhitened supplement

A test for the effectiveness of prewhitening is that the autocorrelation function of the prewhitened series shows it to be a random walk. The prewhitening used here and throughout assumes a first order autoregressive model

$$\text{i.e.} \quad (X_t - X_{t-1}) = \emptyset(X_{t-1} - X_{t-2}) + \varepsilon_t$$

Previous work has shown this model to be usually adequate for the published series, identification of other models when this is not appropriate is likely to be too time consuming to be worthwhile.

Platts - simple prewhitening was not effective

Petroleum Argus - prewhitening was acceptable

AFM - not needed

The only acceptable evidence of more than a coincident relationship is betweeen Petroleum Argus and the SG adj. weighted average with r_0 = .517, r_1 = .476 indicating some evidence of PA leading COMMA the value for r_1 is not significant for the unadjusted weighted average. The moving cross correlation shows r_{-1} being very volatile going from -.8 to +.9. r_0 goes from .2 to .9, r_1 from -.02 to .94.

REGULAR MOGAS BARGES

1. Single Series Analysis

Platts	$r_1 = .5129\ (>.35)$	autocorrelated
Pet Arg	$r_1 = .3055\ (\not>.39)$	random
AFM	$r_1 - .0243\ (\not>.37)$	random
COMMA unadjusted wt Av	$r_1 = .5755\ (\not>.9)$	random
COMMA SG adj wt AV	$r_1 = .3368\ (\not>.9)$	random

Too few observations to say much about the COMMA series.

2. Ditto

3. Bounds Analysis

	Unadjusted			SG Adjusted		
	Platts	PA	AFM	Platts	PA	AFM
Prob of Exceeding Limits				.370	.643	.602
Mean Deviation	4.461	4.004	3.473	3.580	2.885	2.592
Root Mean Square Error	6.253	6.216	8.972	6.177	5.602	9.605
Root Mean % Square Error	1.695	1.657	2.440	1.675	1.502	2.617

4. Product Content Analysis

(i) $$\text{Reported Price} = \underset{(.0109)}{1.0006}\ \frac{\text{Wt Av SG}}{\text{Act SG}}\ \text{Wt Av Price} + \underset{(405.3)}{93.76}\ (\text{Act Lead} - \text{Wt Av Lead})$$

(ii) $$\text{Reported Price} = \underset{(.0089)}{.9994}\ \frac{\text{Wt Av SG}}{\text{Act SG}}\ \text{Wt Av Price}$$

(iii) Reported Price = $\underset{(481.4)}{12.27}$ (Act Lead - Wt Av Lead)

SG is well accounted for, lead is totally insignificant as an explanatory variable.

NAPTHA CARGOES

1. Single Series Analysis

	Autocorrelation at lag 1	Deduction
Platts Midpoint	.5061 (.28)	Autocorrelated
Pet Arg Midpoint	.4591 (.28)	Autocorrelated
COMMA Wt Av	.5411 (.49)	Autocorrelated

2. Pairwise Analysis

Pet Arg vs COMMA $r_{-1} = .6665$ $r_0 = .8694$ $r_1 = .5689$

Moving correlation: r_0 is significant apart from a four week period starting in week 38.

Platts vs COMMA $r_{-1} = .7905$ $r_0 = .7774$ $r_1 = .3720$

Moving correlation behaves as above.

3. Analysis of bounds

	Platts	Pet Arg
Probability of price outside limits	.372	.366
Mean Deviation	-1.214	-.141
Root Mean Square Error	4.540	3.232
Root Mean % Square Error	1.325	.919

4. Product Content Analysis

Reported Price = Wt Av Price = -0.4367 x (parafinic content - w.a.p. content)
(.4352)

No evidence of parafinic content affecting price.

Prewhitened Supplement

Platts, Pet Arg and COMMA series all adequately prewhitened

Platts vs COMMA $r_{-1} = .6324$ $r_0 = .4014$ not significant

Pet Arg vs COMMA $r_{-1} = .6382$ $r_0 - .5336$

Evidence that COMMA leads both Platts and Petroleum Argus, correlation between coincident Platts and COMMA is not significant at 10% even, i.e. Most information in Platts could be a week old.

GASOIL CARGOES

1. Single Series Analysis

Series	Autocorrelation at lag 1	Deduction
Midpoint of Platts	.480 (>.28)	Autoregressive
Midpoint of Pet Arg	.397 (>.28)	Autoregressive
COMMA unadj wt av	.247 (≯.44	Random
COMMA SG adjusted	.298 (≯.60)	Random

2. Pairwise Analysis - Overall cross-correlations

	lag -1	lag 0	lag +1
COMMA unadjusted vs Platts	.484 (27)	.755 (27)	.447 (26)
- - Pet Arg	.401 (27	.751 (27)	.408 (26)
COMMA SG adj vs Platts	.299* (15)	.778 (15)	.561 (14)
Pet Arg	.283* (15)	.734 (15)	.443 (14)

(d of f) $r_{15} > .4124$ at 5% 1 sided for significance

$r_{27} > .3115$ at 5% 1 sided for significance

* values not significant

Moving cross correlation:

Platts vs Unadjusted. Correlation at 0 starts insignificant but becomes high by week 30, the same is true at -1 although it does go negative for a period. Correlation at 1 is significant for quarters beginning weeks 38 to 43.

Petroleum Argus vs Unadjusted. Similar pattern but very few observations in each 13 week period.

Shortage of SG adjusted observations makes analysis unworthwhile

3. Analysis of Bounds

	COMMA unadjusted		COMMA SG adjusted	
	Platts	Pet Arg	Platts	Pet Arg
Av probability of exceeding limits			.338	.447
Mean Deviation	-2.323	-.923	-3.354	-1.454
Root mean square error	7.327	7.100	8.440	8.182
Root mean % error	2.192	2.075	2.509	2.345

4. Product Content Analysis

(i) $$\text{Reported price} = \underset{(.0073)}{.9982}\left(\frac{\text{Wt Av SG}}{\text{Act SG}}\right)\text{Wt Av Price} + \underset{(9.0011)}{(-14.42)}(\text{Act Sulphur} - \text{WA Sulphur})$$

(ii) $$\text{Reported price} = \underset{(.0076)}{.9986}\left(\frac{\text{Wt Av SG}}{\text{Act SG}}\right)\text{Wt Av Price}$$

(iii) $$\text{Reported price} = \underset{(8.35)}{-17.06}\ (\text{Act Sulphur} - \text{WA Sulphur})$$

The coefficient for sulphur in (i) is significant at about 15%, and in (iii) at 5%. Again SG is well accounted for.

Prewhitened Supplement

Both Platts and Petroleum Argus series were adequately prewhitened.

(i) vs unadjusted weight average

Platts has r_0 and r_1 significant (r_0 = .7131, r_1 = .5655)

Pet Arg has r_0 and r_1 significant (r_0 = .7026, r_1 = .5829)

(ii) vs SG adjusted weighted average

Platts has r_0 only significant (r_0 = .7385)

Pet Arg has r_0 only significant (r_0 = .6854)

Few observations of SG adjusted series.

Again some evidence of Platts and Pet Arg leading the market.

GASOIL BARGES

1. Single Series Analysis

(i) Platts Midpoint - correlation at lag 1 significant (.4275 > .28) indicative of autoregressive series.

(ii) Petroleum Argus Midpoint - correlation at lag 1 significant (.4047 > .28)

(iii) AFM Midpoint - correlation at lag 1 significant (.3102 > .28)

(iv) COMMA unadjusted - correlation at lag 1 significant (.3452 > .28)

(v) COMMA SG adjusted - correlation at lag 1 significant (.3299 > .28)

All the series are autocorrelated. Just as a matter of interest if you take observations of a random walk and then group them and take averages you get an autocorrelated series - this might explain why this heavily traded market is autocorrelated and the less heavily traded (e.g. Premium Mogas) are not.

2. Pairwise Analysis - Overall cross correlations

		-1		lag 0		1	
COMMA unadj vs	Platts	.4420	(48)	.9443	(49)	.3415	(48)
	Pet Arg	.3063	(48)	.7548	(49)	.6569	(48)
	AFM	.4018	(48)	.6716	(49)	.5179	(48)
COMMA SG adjusted vs	Platts	.4138	(42)	.9493	(43)	.3378	(42)
	Pet Arg	.2537	(42)	.7133	(43)	.6937	(42)
	AFM	.3651	(42)	.6457	(43)	.5380	(42)

significant value for r with d of f = 40 is .2573 at 5% (1 sided). i.e. with one exception all the correlations appear significant

Moving Cross Correlations - COMMA unadjusted

(i) Platts. Correlation at lag 0 consistently high (>.88), correlation at lag 1 never very high only once significant at 5% 2 sided, correlation at lag -1 rises from non-significance to significance around week 49.

(ii) Petroleum Argus. At lag 0 correlation not significant until week 32 coincidently at lag 1 correlation starts high and drops. Correlation at lag -1 rises from non significance towards week 48-52 but is rarely very significant.

(iii) AFM. Correlation at lag 0 not always significant and not as high as Platts correlation. Correlations at lags +1 and -1 are on the brink of significance (around .53) but rarely far above for the whole year. COMMA SG adjusted.

(iv), (v) and (vi) Broadly reflect the same behaviour.

3. Analysis of Bounds

	COMMA unadjusted			COMMA SG adjusted		
	Platts	Pet Arg	AFM	Platts	Pet Arg	AFM
Av Prob of falling outside limits				21.2%	56.0%	25.3%
Mean Deviation	.393	-6.598	-.490	-.399	-.961	-1.003
Root Mean Square Error	3.748	6.598	7.628	3.446	6.817	7.118
Root Mean % Square Error	1.111	1.907	2.261	1.029	1.985	2.124

4. Product Content Analysis

(i) Reported Price = $\underset{(.0099)}{.9988}\left(\frac{\text{WA SG}}{\text{Act SG}}\ \text{WA price}\right)$

$+ \underset{(43.99)}{(-61.877)}$ (Sulpher content - Midpoint of Sulphur content)

(ii) Reported Price = $\underset{(.0141)}{.9901}\left(\frac{\text{WA SG}}{\text{Act SG}}\ \text{WA price}\right)$

(iii) Reported Price =

$\underset{(39.2)}{-116.4}$ (Sulphur content - Midpoint of Sulphur content)

The SG coefficient is almost exactly 1 as one would expect for a market dealing efficiently with SG information. In equation (i) the coefficient for sulphur would be significant at about 15% two sided. In equation (iii) the sulphur is significant at 5% - the coefficient has also changed a lot one reason for this is that different observations are used for (i) and (iii) since some weeks are missing either SG or sulphur values. I would expect equation (i) to be a more accurate reflection of reality since it does use the SG information.

Prewhitened Supplement

The prewhitening of all the series is effective i.e. the first order autoregressive model was adequate and the prewhitened differences are random.

(i) vs COMMA unadjusted

Platts coincident correlation only is significant (r_0 = .9230)

Petroleum Argus coincident correlation and lag 1 significant (r_0 = .5675
r_1 = .5655)

Similarly AFM r_0 = .4963 r_1 = .3590

(ii) vs COMMA GS adjusted

as before Platts $r_0 = .9371$

Petroleum Argus $r_0 = .4824$ $r_1 = .6547$

AFM $r_0 = .4698$ $r_1 = .4052$

Thus for both Petroleum Argus and AFM there is some evidence that they led the market. The actual strength of the relationship varied throughout the year as can be seen by the moving cross-correlation.

MAXIMUM 1% FUEL OIL BARGES

1. Single Series Analysis

Platts	$r_1 = .4839 > .28$	autocorrelated
Petroleum Argus	$r_1 = .2890 > .28$ (just)	just autocorrelated
COMMA	$r_1 = .4578 > .32$	autocorrelated

2. Pairwise Analysis

Platts	r_{-1} and r_0 significant
Petroleum Argus	r_0 very significant r_1 and r_{-1} just significant

3. Analysis of Bounds

	Platts	Petroleum Argus
Problem of exceeding bounds	.511	.505
Mean Deviation	1.290	.823
Root Mean Square Error	2.432	2.217
Root Mean % Square Error	1.320	1.205

4. Product Content Analysis

Reported Price - Wt Av Price = -10.317 x (Act Sulphur - Wt Av Sulphur)
(4.45)

Value of sulphur is significant but this factor only explains roughly speaking 1% of the variability in the price.

Prewhitened Supplement

None of the series was properly represented by the simple autoregressive model and in any case only the coincident correlations were significant.

MAXIMUM 2% FUEL OIL BARGES

1. Single Series Analysis

Petroleum Argus series is too short only 3 observations of changes

COMMA series appears to be autocorrelated (12 observations of changes)

2. Pairwise Series Analysis - pointless insufficient data

3. Analysis of Bounds

On the basis of only 4 weeks when there were complete sets of data.

Av prob of price above Pet Arg High is .263

Av prob of price below Pet Arg Low is .357

4. Product Content Analysis

$$(\text{Price} - \text{Wt Av Price}) = \underset{(29.86)}{-7.1019}\ (\text{Sulphur content} - \text{Wt Av Sulphur content})$$

Sulphur is not a significant explanatory variable.

MAXIMUM 3.5% FUEL OIL CARGOES

1. Single Series Analysis

Platts	$r_1 = .5049 > .28$	Autocorrelated
Petroleum Argus	$r_1 = .3904 > .29$	Autocorrelated
COMMA Wt Av	$r_1 = .1232 \ngtr .71$	Random

2. Pairwise Analysis

r_{-1}, r_0, r_1 significant in both cases

Too few observations in moving cross correlation for any conclusion to be reached.

3. Analysis of Bounds

	Platts	Petroleum Argus
Probability of exceeding limits	.594	.399
Mean Deviation	-4.110	-1.039
Root Mean Square Error	5.005	3.824
Root Mean % Square Error	3.292	2.506

4. Product Content Analysis

$$\text{Reported Price} - \text{Wt Av Price} = \underset{(6.479)}{-6.63}\ (\text{Sulphur Content} - \text{Wt Av S Content})$$

Sulphur is not a significant explanatory variable.

Prewhitened Supplement

Platts not effectively prewhitened, Pet Arg was.

No significant cross correlation at all (at 10%) very few observations, for example only 8 coincident differences for comparison.

MAXIMUM 3.5% FUEL OIL BARGES

1. Single Series Analysis

Platts	r_1 = .5374 (>.28)	Autocorrelated
Petroleum Argus	r_1 = .3051 (>.28)	Autocorrelated
COMMA	r_1 = .0574 ($\not>$.52)	Random

2. Pairwise Analysis

Platts vs COMMA r_0, r_1 significant

Petroleum Argus vs COMMA r_0 not significant at 5% 1 sided, r_1 significant

3. Analysis of Bounds

	Platts	Petroleum Argus
Probability of exceeding bounds	.450	.528
Mean deviation	.513	.857
Root Mean Square Error	3.429	4.636
Root Mean % Square Error	2.336	3.127

4. Product Content Analysis

Reported Price - Wt Av Price = -8.67 (Act Sulphur Content - Wt Av S Content)
(2.1243)

Sulphur is significant at 5% and explains 14% of the price variation.

Prewhitened Supplement

Petroleum Argus effectively prewhitened, Platts was not.

However in both cases only r_1 was significant (r_1 = .6995 for Pet Arg) indicating a lead by the published price over the market price by a week. There are only 15 observations of week to week changes so the conclusions are not founded on a very broad basis.

COMMA VS EUROPEAN COUNTRIES

Premium Mogas

Generally no evidence of any statistical relationship between COMMA and the country prices. The points of interest are

(i) Italy

Significant lag at 1 week correlation -.5666 i.e. COMMA leads Italy by 1 week - this was for unadjusted COMMA for adjusted the figure changes to -.6119.

(ii) Ireland

Far weaker but significant correlation at 2 weeks lag of -.3669, i.e. COMMA leads by 2 weeks, -.3601 for adjusted series.

(iii) UK

Correlation of .375 at 2 weeks for adjusted only, nothing apparent for the unadjusted series.

(iv) Netherlands

A spurious (presumably) correlation at -6 weeks (i.e. Netherlands leading COMMA) of -.55, and -.53 adjusted.

Gasoil

Not many significant correlations at all appeared and in contrast with Mogas there was little similarity between results for adjusted and unadjusted. Points of interest are:

(i) Denmark

Significant correlation at lag 0 i.e. coincident r_0 = .4643 (unadjusted)

(ii) Germany

As Denmark r_0 = .4184 (unadjusted)

(iii) France

The prewhitened series is not very good but the only significant cross correlation is r_0 = .3433 (unadjusted)

(iv) Netherlands

Significant correlation at 3 weeks (COMMA leads by 3) of .3651 and 'spurious' correlation at -1 week of -.308 (unadjusted)

(v) Ireland

Significant correlation at 2 weeks (COMMA leads by 2) of -.4841 (over adjusted series)

(vi) Barely significant correlations at -1 week for Denmark vs unadjusted and for Italy at +5 weeks. (for adjusted series)

General Comments

Even the few significant correlations are low in absolute terms indicating that COMMA prices are at most a minor determinant of prices. That is the internal prices and the COMMA prices are responding to the same general pressures but there is little evidence of internal prices being affected by the Rotterdam price (as measured by COMMA).

Heavy Fuel Oil

None of the series was sufficiently autocorrelated to warrant prewhitening.

Points of interest were:

(i) Belgium - evidence of a feedback mechanism i.e. significant correlation at 3 weeks of .48 (COMMA leading Belgium) and at -5 weeks of -.49 (Belgium leading COMMA).

(ii) Germany - similar result $r_{+3} = .43$ $r_{-5} = -.53$

(iii) France - significant correlation at +6 weeks (COMMA leading France) of .50 with nearly significant correlation at -5 weeks.

None of the other countries showed any significant correlations at all.

There is some evidence of feedback, i.e. COMMA influences country price and vice versa but these correlations are based on only a maximum of 20 degrees of freedom so must be treated with caution. (Not so much because there are only 20 degrees of freedom but because the absence of COMMA prices may be due to a relevant effect, (e.g. insufficient dealing) which ought ideally to be taken into account.

TABLE A.7.1

PREMIUM MOGAS CARGOES

(Price reports - 11)

	Platts	Argus
High		
No. above high	7	8
No. below high	4	3
Mean deviation at high ($)	6.02	8.29
Mean absolute deviation ($)	6.75	6.29
Low		
No. below low	4	5
No. above low	7	6
Mean deviation at low ($)	3.74	5.84
Mean absolute deviation ($)	4.43	7.57
Weighted Average/Midpoint		
Mean deviation ($)	5.0	7.18
Mean absolute deviation ($)	5.1	8.45
Range		
COMMA range ($)	11.0	11.0
Published price ($)	13.28	13.45

TABLE A.7.2

PREMIUM MOGAS BARGES

(Price reports - 45)

	Platts	Argus	AFM
High			
No. above high	18	12	11
No. below high	27	33	34
Mean deviation at high ($)	0.73	4.84	5.75
Mean absolute deviation ($)	4.64	8.54	9.17
Probability of being above	0.27	0.42	0.49
Low			
No. below low	19	9	25
No. above low	26	36	20
Mean deviation at low ($)	1.68	3.99	1.31
Mean absolute deviation ($).	5.29	6.73	7.41
Probability of being below	0.13	0.20	0.16
Weighted Average/Midpoint			
Mean deviation ($)	- 1.10	- 2.00	- 3.79
Root mean square error ($)	6.77	10.24	10.78
Range			
COMMA range ($)	20.57	20.57	20.57
Published price ($)	18.16	11.73	13.52
Probability of being outside range	0.40	0.62	0.65
Probability of being below midpoint	0.37	0.37	0.30

TABLE A.7.3

REGULAR MOGAS BARGES

(Price reports - 18 16 18)

	Platts	Argus	AFM
High			
No. above high	6	2	5
No. below high	12	14	13
Mean deviation at high ($)	2.95	6.19	4.13
Mean absolute deviation ($)	5.29	6.69	7.65
Probability of being above	0.27	0.45	0.37
Low			
No. below low	14	9	11
No. above low	4	7	7
Mean deviation at low ($)	-6.50	-2.41	-3.35
Mean absolute deviation ($)	7.17	5.53	7.20
Probability of being below	0.10	0.20	0.23
Weighted Average /Midpoint			
Mean deviation ($)	- 4.46	- 4.00	- 3.47
Root mean square error ($)	6.25	6.22	8.97
Range			
COMMA range ($)	12.17	12.78	12.17
Published price ($)	15.72	9.0	11.39
Probability of being outside range	0.37	0.64	0.60
Probability of being below midpoint	0.32	0.34	0.39

TABLE A.7.4

NAPHTHA CARGOES

(Price reports - 34)

	Platts	Argus
High		
No. above high	19	19
No. below high	15	15
Mean deviation at high ($)	-1.46	-0.52
Mean absolute deviation ($)	3.05	3.78
Probability of being above	0.15	0.19
Low		
No. below low	13	18
No. above low	21	16
Mean deviation at low ($)	1.09	-0.12
Mean absolute deviation ($)	3.76	4.09
Probability of being below	0.22	0.18
Weighted Average/Midpoint		
Mean deviation ($)	1.21	0.14
Root mean square error ($)	4.54	3.23
Range		
COMMA range ($)	10.33	10.33
Published price ($)	10.71	10.97
Probability of being outside range	0.37	0.37
Probability of being below midpoint	0.57	0.46

TABLE A.7.5

NAPHTHA BARGES

(Price reports - 17)

	Platts	Argus
High		
No. above high	4	7
No. below high	13	10
Mean deviation at high ($)	0.44	2.67
Mean absolute deviation ($)	2.83	4.48
Low		
No. below low	11	13
No. above low	6	4
Mean deviation at low ($)	0.92	(0.49)
Mean absolute deviation ($)	2.45	5.13
Weighted average /Midpoint		
Mean deviation ($)	0.30	0.71
Mean absolute deviation ($)	2.05	3.32
Range		
COMMA range ($)	8.96	8.96
Published price ($)	8.48	12.12

TABLE A.7.6

GASOIL CARGOES

(Price reports - 40)

	Platts	Argus
High		
No. above high	28	24
No. below high	12	16
Mean deviation at high ($)	-4.16	-1.61
Mean absolute deviation ($)	7.16	7.02
Probability of being above	0.11	0.17
Low		
No. below low	15	11
No. above low	25	29
Mean deviation at low ($)	2.84	2.59
Mean absolute deviation ($)	7.88	8.76
Probability of being below	0.23	0.28
Weighted Average/Midpoint		
Mean deviation ($)	2.32	0.92
Root mean square error ($)	7.33	7.10
Range		
COMMA range ($)	18.00	18.00
Published price ($)	19.32	17.02
Probability of being outside range	0.34	0.45
Probability of being below midpoint	0.65	0.64

TABLE A.7.7

GASOIL BARGES
(Price reports - 52)

	Platts	Argus	AFM
High			
No. above high	3	2	11
No. below high	49	50	41
Mean deviation at high ($)	5.78	9.24	4.02
Mean absolute deviation ($)	5.91	9.39	7.14
Probability of being above	0.08	0.21	0.10
Low			
No. below low	6	3	17
No. above low	46	49	35
Mean deviation at low ($)	4.80	9.28	4.80
Mean absolute deviation ($)	6.54	10.68	7.66
Probability of being below	0.13	0.36	0.16
Weighted Average /Midpoint			
Mean deviation ($)	-0.39	0.12	0.49
Root mean square error ($)	3.75	6.60	7.63
Range			
COMMA range ($)	28.26	28.26	28.26
Published price ($)	17.67	9.73	19.44
Probability of being outside range	0.21	0.56	0.25
Probability of being below midpoint	0.55	0.61	0.53

TABLE A.7.8

MAX. 1% FUEL OIL CARGOES
(Price reports - 17)

	Platts	Argus
High		
No. above high	9	9
No. below high	8	8
Mean deviation at high ($)	1.52	1.29
Mean absolute deviation ($)	3.95	5.18
Low		
No. below Low	9	10
No. above low	8	7
Mean deviation at low ($)	4.27	(2.03)
Mean absolute deviation ($)	5.74	3.47
Weighted average/Midpoint		
Mean deviation ($)	3.84	0.28
Mean absolute deviation ($)	4.11	4.06
Range		
COMMA range ($)	10.22	10.22
Published price($)	7.47	13.53

MAXIMUM 1% FUEL OIL BARGES

(Price reports - 46)

	Platts	Argus
High		
No. above high	7	12
No. below high	39	34
Mean deviation at high ($)	2.98	2.61
Mean absolute deviation ($)	3.61	3.35
Probability of being above	0.40	0.32
Low		
No. below low	25	22
No. above low	21	24
Mean deviation at low ($)	-0.18	0.39
Mean absolute deviation ($)	1.77	2.47
Probability of being below	0.12	0.18
Weighted Average/Midpoint		
Mean deviation ($)	- 1.29	- 0.82
Root mean square error ($)	2.43	2.22
Range		
COMMA range ($)	7.72	7.72
Published price ($)	4.91	4.72
Probability of being outside range	0.51	0.51
Probability of being below midpoint	0.32	0.39

TABLE A.7.10

MAXIMUM 2% FUEL OIL BARGES

(Price comparisons - 4)

	Argus
High	
No. above high	2
No. below high	2
Mean deviation at high ($)	3.39
Mean absolute deviation ($)	5.36
Probability of being above	0.26
Low	
No. below low	2
No. above low	2
Mean deviation at low ($)	1.51
Mean absolute deviation ($)	3.26
Probability of being below	0.36
Weighted Average/Midpoint	
Mean deviation	- 0.14
Root mean square error	1.66
Range	
COMMA range ($)	9.65
Published price ($)	4.75
Probability of being outside range	0.62
Probability of being below midpoint	0.56

Although there were 24 COMMA price reports, few comparisons were possible because of a lack of matching published reports.
For this reason the above data are not statistically significant.

TABLE A.7.11

MAXIMUM 3.5% FUEL OIL CARGOES

(Price reports - 28)

	Platts	Argus
High		
No. above high	20	18
No. below high	8	10
Mean deviation at high ($)	-2.30	-0.83
Mean absolute deviation ($)	4.60	4.82
Probability of being above	0.12	0.16
Low		
No. below low	1	10
No. above low	27	18
Mean deviation at low ($)	4.78	0.10
Mean absolute deviation ($)	5.08	3.36
Probability of being below	0.49	0.24
Weighted Average/Midpoint		
Mean deviation ($)	4.11	1.04
Root mean square error ($)	5.01	3.82
Range		
COMMA range ($)	11.87	11.87
Published price ($)	9.39	12.61
Probability of being outside range	0.59	0.40
Probability of being below midpoint	0.75	0.57

TABLE A.7.12

MAXIMUM 3.5% FUEL OIL BARGES

(Price reports - 32)

	Platts	Argus
High		
No. above high	10	10
No. below high	22	22
Mean deviation at high ($)	2.48	3.07
Mean absolute deviation ($)	4.46	5.04
Probability of being above	0.26	0.31
Low		
No. below low	20	17
No. above low	12	15
Mean deviation at low ($)	-0.19	-0.28
Mean absolute deviation ($)	1.95	1.91
Probability of being below	0.19	0.22
Weighted Average /Midpoint		
Mean deviation ($)	- 0.51	- 0.86
Root mean square error ($)	3.43	4.64
Range		
COMMA range ($)	8.13	8.13
Published price($)	5.84	5.34
Probability of being outside range	0.45	0.53
Probability of being below midpoint	0.48	0.48

TABLE A.7.13

GASOIL MEDITERRANEAN FOB

(Price reports - 6)

	Platts
High	
No. above high	3
No. below high	3
Mean deviation at high ($)	1.58
Mean absolute deviation ($)	2.25
Low	
No. below low	3
No. above low	3
Mean deviation at low ($)	(4.07)
Mean absolute deviation ($)	4.18
Weighted average/Midpoint	
Mean deviation ($)	(1.35)
Mean absolute deviation ($)	3.76
Range	
COMMA range ($)	6.93
Published price ($)	12.59

TABLE A.7.14

GASOIL MEDITERRANEAN CIF

(Price reports - 14)

	Platts
High	
No. above high	7
No. below high	7
Mean deviation at high ($)	0.16
Mean absolute deviation ($)	2.84
Low	
No. below low	4
No. above low	10
Mean deviation at low ($)	1.83
Mean absolute deviation ($)	3.61
Weighted average/Midpoint	
Mean deviation ($)	0.99
Mean absolute deviation ($)	2.64
Range	
COMMA range($)	10.52
Published price ($)	8.60

TABLE A.7.15

MAX. 3.5% FUEL OIL MEDITERRANEAN CIF

(Price reports - 8)

	Platts
High	
No. above high	3
No. below high	5
Mean deviation at high ($)	2.83
Mean absolute deviation ($)	4.7
Low	
No. below low	5
No. above low	3
Mean deviation at low ($)	0.81
Mean absolute deviation ($)	3.31
Weighted average/Midpoint	
Mean deviation ($)	0.73
Mean absolute deviation ($)	3.42
Range	
COMMA range ($)	11.58
Published price ($)	8.62

HIGHS AND LOWS AS AN INDEX OF COMMA

Index: weighted average = 100

	COMMA	PLATTS	ARGUS	AFM
PREMIUM MOGAS (B)				
High	102.3	102.1	101.1	100.8
Low	96.9	97.3	98.0	97.2
REGULAR MOGAS (B)				
High	101.7	100.9	100.2	100.6
Low	98.4	96.7	97.7	97.6
NAPHTHA (C)				
High	101.5	101.9	101.6	-
Low	98.5	98.8	98.4	-
GASOIL (C)				
High	102.3	103.6	102.9	-
Low	97.0	97.8	97.7	-
GASOIL (B)				
High	104.3	102.5	101.5	103.0
Low	95.8	97.2	98.6	97.3
MAX. 1% FUEL OIL (B)				
High	102.3	100.7	100.9	-
Low	98.0	97.9	98.2	-
MAX. 2% FUEL OIL (B)				
High	103.3	-	101.3	-
Low	97.6	-	98.5	-
MAX. 3.5% FUEL OIL (C)				
High	104.3	105.7	104.7	-
Low	96.5	99.7	96.6	-
MAX. 3.5% FUEL OIL (B)				
High	103.2	101.6	101.2	-
Low	97.8	97.8	97.7	-

TABLE A.7.17

COMMA BOUNDS ANALYSIS: Published Prices and COMMA

	Publication	All prices 1	2	3	Rising prices 1	2	3	Falling prices 1	2	3
PREMIUM MOGAS	Platts	.27	.13	.37	.39	.05	.22	.14	.18	.49
Barges	Argus	.42	.20	.37	.48	.10	.26	.32	.31	.51
	AFM	.49	.16	.30	.55	.11	.24	.44	.24	.38
REGULAR MOGAS	Platts	.32	.05	.27	.30	.08	.33	.41	.02	.30
Barges	Argus	.49	.13	.26	.45	.15	.31	.59	.13	.19
(Unadjusted)	AFM	.41	.17	.34	.46	.18	.29	.06	.42	.82
NAPHTHA	Platts	.15	.22	.57	.14	.20	.57	.18	.19	.58
Cargoes	Argus	.19	.18	.46	.20	.19	.53	.11	.09	.38
	AFM									
GASOIL	Platts	.11	.23	.65	.17	.09	.51	.07	.29	.77
Cargoes	Argus	.17	.28	.64	.27	.24	.56	.11	.25	.69
	AFM									
GASOIL	Platts	.08	.13	.55	.09	.09	.49	.07	.16	.60
Barges	Argus	.21	.36	.61	.15	.34	.64	.22	.39	.61
	AFM	.10	.16	.53	.12	.11	.45	.08	.18	.60
MAX. 1% FUEL OIL	Platts	.40	.12	.32	.45	.07	.25	.30	.18	.42
Barges	Argus	.32	.18	.39	.35	.13	.34	.30	.28	.47
	AFM									
MAX. 2% FUEL OIL	Platts									
Barges	Argus	.26	.36	.56	.50	.50	.76	.50	.17	.31
	AFM									
MAX. 3.5% FUEL OIL	Platts	.12	.49	.75	.14	.38	.66	.06	.58	.88
Cargoes	Argus	.16	.24	.57	.18	.20	.52	.04	.34	.84
	AFM									
MAX. 3.5% FUEL OIL	Platts	.26	.19	.48	.35	.14	.40	.22	.32	.57
Barges	Argus	.31	.22	.48	.27	.15	.54	.33	.33	.51
	AFM									

1) Probability of COMMA price reports appearing above the published high.
2) Probability of COMMA price reports appearing below the published low.
3) Probability of COMMA price reports appearing below the published midpoint.

TABLE A.7.18

FUEL OIL SULPHUR VALUES

Month	Week No.	Sulphur Value* ($)
June	26	11.82
July	27	7.03
	28	5.83
	29	6.79
	30	5.74
August	31	6.69
	32	6.27
	33	7.37
	34	8.38
September	39	10.52
October	40	8.20
	41	7.15
	43	7.53
November	44	6.17
	45	7.40
	46	5.39
	47	5.18
December	52	13.24
January	01	15.91
	02	14.98
	04	10.71
February	05	10.13
	06	16.84
	08	13.97

* Per degree of sulphur, calculated from the differences in weighted average prices and sulphur contents for 1% and 3.5% grades.

Gaps occur where there is not a full set of matching data.

NUMBERS OF PRICE REPORTS

	June-Aug	Sept-Nov	Dec-Feb	Mar-May	Annual Total
PREMIUM MOGAS					
Cargoes	3	4	4	2	13
Barges	11	12	10	12	45
FOB	1	0	0	0	1
CIF	0	0	0	0	0
REGULAR MOGAS					
Cargoes	0	0	0	2	2
Barges	3	6	5	10	24
FOB	0	0	0	0	0
CIF	0	0	0	0	0
NAPHTHA					
Cargoes	6	11	7	11	35
Barges	2	3	4	10	19
FOB	1	1	0	0	2
CIF	0	0	1	0	1
GASOIL					
Cargoes	10	7	12	11	40
Barges	13	13	13	13	52
FOB	2	2	2	0	6
CIF	2	5	6	1	14
MAX. 1% FUEL OIL					
Cargoes	4	4	5	6	19
Barges	11	12	13	11	47
FOB	0	0	0	0	0
CIF	0	0	0	0	0
MAX. 2% FUEL OIL					
Cargoes	1	0	0	1	2
Barges	3	6	10	9	28
FOB	0	0	0	0	0
CIF	0	0	0	0	0
MAX. 3.5% FUEL OIL					
Cargoes	5	8	6	8	27
Barges	12	9	8	7	36
FOB	1	0	0	0	1
CIF	0	0	5	3	8
TOTAL					
Cargoes	29	34	34	41	138
Barges	55	61	63	72	251
FOB	5	3	2	0	10
CIF	2	5	12	4	23
GRAND TOTAL	91	103	111	117	422

Notes: All Cargoes and Barges Price Reports are for Northwest Europe, and FOB and CIF are for the Mediterranean.

TABLE A.8.1

SPOT PRICES AS % OF AVERAGE NETBACKS : JUNE 1979 - MAY 1980

	BELG.	DEN.	GER.	FRA.	IRE.	IT.	NETH.	U.K.	EEC AV.
PREMIUM MOGAS									
JUNE	143	135	139	153	129	211	137	128	142
JULY	128	123	126	135	118	200	129	104	128
AUGUST	113	110	108	119	92	133	113	92	107
SEPT.	104	102	100	106	86	120	99	87	99
OCT.	105	113	103	109	93	130	103	92	105
NOV.	112	125	112	119	103	143	112	103	116
DEC.	107	136	116	120	107	151	110	168	119
JAN.	103	133	113	109	112	120	114	103	110
FEB.	89	111	98	100	100	112	102	94	100
MARCH	89	99	103	102	96	113	100	95	101
APRIL	82	90	96	97	93	107	93	91	96
MAY	87	86	91	82	90	103	84	87	91
REGULAR MOGAS									
JUNE	146	135	152	165	130	222	139	129	147
JULY	132	124	144	150	119	212	134	104	132
AUGUST *									
SEPT. *									
OCT.	110	119	114	104	97	100	109	96	111
NOV.	115	127	121	129	104	160	117	104	119
DEC.	108	136	122	126	107	154	112	108	120
JAN.	102	131	115	112	110	121	115	101	114
FEB.	89	110	102	104	99	114	103	93	102
MARCH	92	100	108	108	97	118	104	96	106
APRIL	83	89	100	101	93	110	93	91	98
MAY	90	86	97	96	92	107	87	88	95

* insufficient COMMA information.

TABLE A.8.2

SPOT PRICES AS % OF AVERAGE NETBACKS

	BELG.	DEN.	GER.	FRA.	IRE.	IT.	NETH.	U.K.	EEC AV.
GASOIL									
JUNE	172	164	126	203	135	222	184	157	162
JULY	161	153	125	194	133	189	178	136	153
AUGUST	132	121	106	167	97	138	142	112	121
SEPT.	132	113	107	156	101	140	132	117	122
OCT.	127	112	108	156	109	142	129	120	127
NOV.	135	124	114	116	120	151	141	131	137
DEC.	125	121	107	-47	115	144	127	124	126
JAN.	114	113	99	125	115	113	125	113	111
FEB.	97	96	88	107	97	99	104	92	96
MARCH	97	94	92	104	92	99	102	89	97
APRIL	108	103	103	94	104	96	107	109	100
MAY	98	95	91	103	97	102	93	91	97
HEAVY FUEL OIL									
JUNE	164	139	117	135	81	124	143	129	125
JULY	158	137	114	129	79	119	140	107	119
AUGUST	132	126	107	116	68	108	129	99	107
SEPT.	129	111	105	111	68	108	118	100	103
OCT.	139	121	114	122	79	120	118	111	115
NOV.	138	130	119	120	85	128	126	119	121
DEC.	131	138	116	110	89	125	126	122	118
JAN.	111	107	102	97	86	96	115	104	95
FEB.	98	91	89	92	74	86	92	87	89
MARCH	94	91	90	100	72	91	89	86	91
APRIL	96	100	92	88	122	92	100	105	101
MAY	94	87	93	95	99	94	88	90	92

CRUDE VALUES AND REFINERS' MARGINS: SPOT AND GSP BASIS

ARAB LIGHT 33.5°

	Gross Product Worth	Refiners' Margins Spot	Refiners' Margins GSP
JUNE	35.3	(1.2)	16.3
JULY	36.3	2.7	16.8
AUGUST	33.1	(0.6)	13.9
SEPT.	33.6	(2.6)	14.4
OCT.	35.6	(2.5)	16.2
NOV.	37.4	(3.3)	12.3
DEC.	38.7	(2.0)	13.3
JAN.	38.1	0.8	12.8
FEB.	34.0	(3.0)	7.0
MARCH	33.7	(3.1)	6.6
APRIL	34.4	(2.6)	5.4
MAY	34.5	(2.5)	5.6

IRANIAN HEAVY 31.5°

	Gross Product Worth	Refiners Margins Spot	Refiners Margins GSP
JUNE	32.9	(1.2)	14.1
JULY	33.7	2.5	12.2
AUGUST	31.0	(1.8)	9.7
SEPT.	31.8	(3.3)	10.6
OCT.	33.9	(4.9)	10.3
NOV.	36.2	(3.5)	12.2
DEC.	37.4	(3.1)	8.2
JAN.	37.0	0.7	7.9
FEB.	32.8	(2.2)	1.5
MARCH	32.5	(2.0)	1.2
APRIL	33.1	-	(0.4)
MAY	33.2	(2.7)	(2.1)

ZUETINA 41.0°

	Gross Product Worth	Refiners' Margins Spot	Refiners' Margins GSP
JUNE	39.0	(1.7)	16.3
JULY	39.8	1.1	14.8
AUGUST	-	-	-
SEPT.	36.4	(1.3)	12.2
OCT.	38.3	(0.5)	11.3
NOV.	40.3	(2.4)	13.3
DEC.	41.8	(0.4)	10.9
JAN.	41.5	-	5.6
FEB.	37.6	(1.2)	2.1
MARCH	37.3	(0.8)	2.0
APRIL	36.6	(1.5)	1.3
MAY	37.3	(1.2)	0

BONNY LIGHT 37.0°

	Gross Product Worth	Refiners Margins Spot	Refiners Margins GSP
JUNE	-	-	-
JULY	-	-	-
AUGUST	38.0	0.4	13.5
SEPT.	37.3	(1.2)	12.8
OCT.	39.2	0	4.6
NOV.	41.3	(1.6)	14.1
DEC.	42.9	(1.4)	11.7
JAN.	42.5	0.2	11.2
FEB.	38.1	0	3.1
MARCH	38.2	0	3.3
APRIL	37.5	(1.3)	3.0
MAY	38.2	(0.7)	0.8

Gross product worth calculated on the basis of summer and winter yields, as described in COMMA monthly reports.
Refiners' margins calculated from landed cost of crude, starting with estimated spot prices and Government Selling Prices FOB.

TABLE A.4.9

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT - NWE CARGOES

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY Less than 0.830	0.830 0.835	0.835 0.840	0.840 0.845	0.845 0.850	0.850 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above			0.1	1.3	0.8	0.8	0.7	1.9	0.3	5.9
0.5	0.6		0.7	1.6	4.7	11.8	1.6	1.2	1.6	23.2
0.4	0.5		0.6	1.4	0.4	1.1	0.1		1.1	4.7
0.3	0.4	1.5	2.8	2.4	5.7	11.1	18.5	3.3	0.6	45.9
0.2	0.3	2.2	2.0	1.2	1.9			0.2	2.6	10.1
Less than 0.2			1.6	0.8	0.7					3.1
Not Reported		1.7	0.2	1.1	1.3	1.2	0.2		1.4	7.1
TOTAL		5.4	8.0	9.8	15.5	26.0	21.1	6.6	7.6	100.0

TABLE A.4.10

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT - NWE BARGES

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY Less than 0.830	0.830 0.835	0.835 0.840	0.840 0.845	0.845 0.850	0.850 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above								0.1		0.1
0.5	0.6	0.3	0.7	2.3	2.2	10.2	0.8		1.5	18.0
0.4	0.5	0.1	0.2	0.1	0.5	2.4	0.8		0.1	4.2
0.3	0.4	1.5	2.6	4.0	6.6	43.7	2.3	0.7	7.8	69.2
0.2	0.3	0.1	0.1	0.4	0.2	0.2				1.0
0.1	0.2	0.1	0.1	0.1						0.3
Less than 0.1										0.0
Not Reported		0.1	2.7	0.5	0.9	1.9	0.2		0.9	7.2
TOTAL		2.2	6.4	7.4	10.4	58.4	4.1	0.8	10.3	100.0

TABLE A.4.11

GASOIL: QUALITY SORTING BY SPECIFIC AND SULPHUR CONTENT - MEDITERRANEAN CIF

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY Less than 0.830	0.830 0.835	0.835 0.840	0.840 0.845	0.845 0.850	0.850 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above				2.2	3.8	16.9	10.6		1.3	34.8
0.5	0.6		0.7		4.1	11.2	7.6		0.6	24.2
0.4	0.5		1.5	2.6	0.3	0.8	2.5			7.7
0.3	0.4		1.7	3.3	3.6	8.9	2.5			20.0
0.2	0.3		0.8			1.3	1.2			3.3
0.1	0.2	0.8	0.4	3.3						4.5
Less than 0.1										0.0
Not Reported					0.9	1.3	2.3		1.0	5.5
TOTAL		0.8	5.1	11.4	12.7	40.4	26.7	0.0	2.9	100.0

TABLE A.4.12

GASOIL: QUALITY SORTING BY SPECIFIC GRAVITY AND SULPHUR CONTENT - MEDITERRANEAN FO

Per cent of total valid transactions by weight

SULPHUR CONTENT % wt. From	To Less than	SPECIFIC GRAVITY Less than 0.830	0.830 0.835	0.835 0.840	0.840 0.845	0.845 0.850	0.850 0.855	0.855 and above	Not Reported	TOTAL
0.6 and above				5.5	8.5	13.0	8.0	2.4		37.4
0.5	0.6	1.4		3.1	20.8	9.3	1.4			36.0
0.4	0.5									0.0
0.3	0.4	3.1		2.2	1.9		1.4			8.6
0.2	0.3						0.2			0.2
Less than 0.2										0.0
Not Reported				2.0	1.9	4.8	3.5	0.8	4.8	17.8
TOTAL		4.5	0.0	12.8	33.1	27.1	14.5	3.2	4.8	100.0

GROUP 1: REFINERS	Checkrun Participants
British Petroleum	x
Chevron Oil Europe	x
Total	x
Elf/Erap	x
Esso Europe	x
Gulf Oil Company	x
Mobil	x
Phillips Petroleum Company	x
Shell	x
Texaxo Europe	x
Veba	x
Continental Oil	

Italian;

API - Anonima Petroli Italiana s.p.a.	
ENI	x
Garrone s.p.a..	
Inpetrol	
ISAB	
Sanguirico	
Saras s.p.a.	
S.I.R. Consorzio Industrial s.p.a.	x

GROUP 2: MARKETERS	
Allied Petroleum Ltd.	x
BASF	x
DOW Chemical Europe	x
Imperial Chemical Industries	x
Interol B.V.	x
Nedol BV/Gebr Groere BV	
North Sea Petroleum BV	
Petronor	
Transito Petroleum BV	
Union Kraftstoff Wesseling	x
Wintershall	x

Italian:

Cameli and Co s.p.a.
Montedison

GROUP 3: TRADER MARKETERS	Checkrun Participants
Belgische Olie Maatschappij	x
Bamin Heizol GmBH	
Borra s.p.a.	
Defrol GmBH	
DSM	x
IOC	x
John Hudson & Co.	x
Mercator Holland BV	
Monsanto Europe S.A.	
Petromer S.A.	
Sakko	
V.d. Sluijs Handelsmaatschappij BV	
Urbaine des Petroles	x
Frisol	x
Italian;	
Enel	x

GROUP 4: WHOLESALE TRADERS	
Anro Oil	x
Bulk Oil (Germany) GmBH	
Mabanaft GmBH	
Petra European Trading Co. BV	x
Tampimex Oel und Transport GmBH	
Transol	x

GROUP 5: INTERNATIONAL TRADERS	
Bulk Oil	x
European Oil Partners	x
Italian;	
Coe and Clerici s.p.a.	

TABLE A.5.7

REPORTS BY CATEGORY OF PARTICIPANT

TOTAL PRODUCTS - NWE BARGES

	Per cent of total tonnage production				
Categories	1	2	3	4	5
%					
1979					
June	44	9	9	28	10
July	32	16	16	31	5
August	34	8	22	28	8
September	42	9	17	28	8
October	40	14	21	18	7
November	36	8	21	29	6
December	41	15	13	28	3
1980					
January	40	13	17	26	4
February	31	8	19	34	8
March	23	19	20	33	5
April	25	13	18	35	9
May	20	11	18	43	8
Total year					
- %	33	11	18	31	7
- thousand tonnes	4363	1455	2382	4077	871

TABLE A.5.8

REPORTS BY CATEGORY OF PARTICIPANT

TOTAL PRODUCTS - NWE CARGOES

			Per cent of total tonnage production		
Categories	1	2	3	4	5
%					
1979					
June	66	4	14	15	1
July	63	5	12	18	2
August	53	12	20	15	1
September	44	16	19	18	3
October	54	20	12	9	5
November	43	13	22	20	2
December	57	10	11	20	2
1980					
January	52	9	11	21	7
February	51	4	17	23	5
March	51	5	20	20	4
April	47	6	12	33	2
May	58	8	21	1	2
Total year					
- %	52	10	16	19	3
- thousand tonnes	9256	1714	2892	3352	556

TABLE A.5.9

REPORTS BY CATEGORY OF PARTICIPANT

GASOIL - NWE BARGES

Categories			Per cent of total tonnage production		
	1	2	3	4	5
%					
1979					
June	33	10	10	38	9
July	27	18	17	33	5
August	20	8	28	33	12
September	33	10	20	32	5
October	31	16	27	19	7
November	21	9	30	32	8
December	23	16	24	34	4
1980					
January	28	14	24	29	5
February	20	8	27	38	7
March	15	10	28	38	9
April	16	12	24	36	12
May	11	9	29	38	13
Total year					
- %	22	11	25	34	8
- thousand tonnes	1782	895	1998	2693	671

TABLE A.5.10

REPORTS BY CATEGORY OF PARTICIPANT

GASOIL - NWE CARGOES

Per cent of total tonnage production

Categories %	1	2	3	4	5
1979					
June	36	1	13	47	3
July	78	0	7	7	8
August	44	0	30	22	4
September	42	34	14	4	6
October	38	19	22	17	4
November	21	14	38	27	0
December	39	19	11	24	7
1980					
January	49	9	9	29	4
February	49	4	0	34	13
March	63	0	2	33	2
April	48	5	18	28	1
May	57	0	20	20	3
Total year					
- %	45	10	17	24	4
- thousand tonnes	1980	439	733	1041	205