



**TOGETHER**  
*for a sustainable future*

## OCCASION

This publication has been made available to the public on the occasion of the 50<sup>th</sup> anniversary of the United Nations Industrial Development Organisation.



**TOGETHER**  
*for a sustainable future*

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

## FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

## CONTACT

Please contact [publications@unido.org](mailto:publications@unido.org) for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at [www.unido.org](http://www.unido.org)



04855



United Nations Industrial Development Organization

---

Distr.  
LIMITED

ID/WG.146/61  
22 May 1973

ORIGINAL: ENGLISH

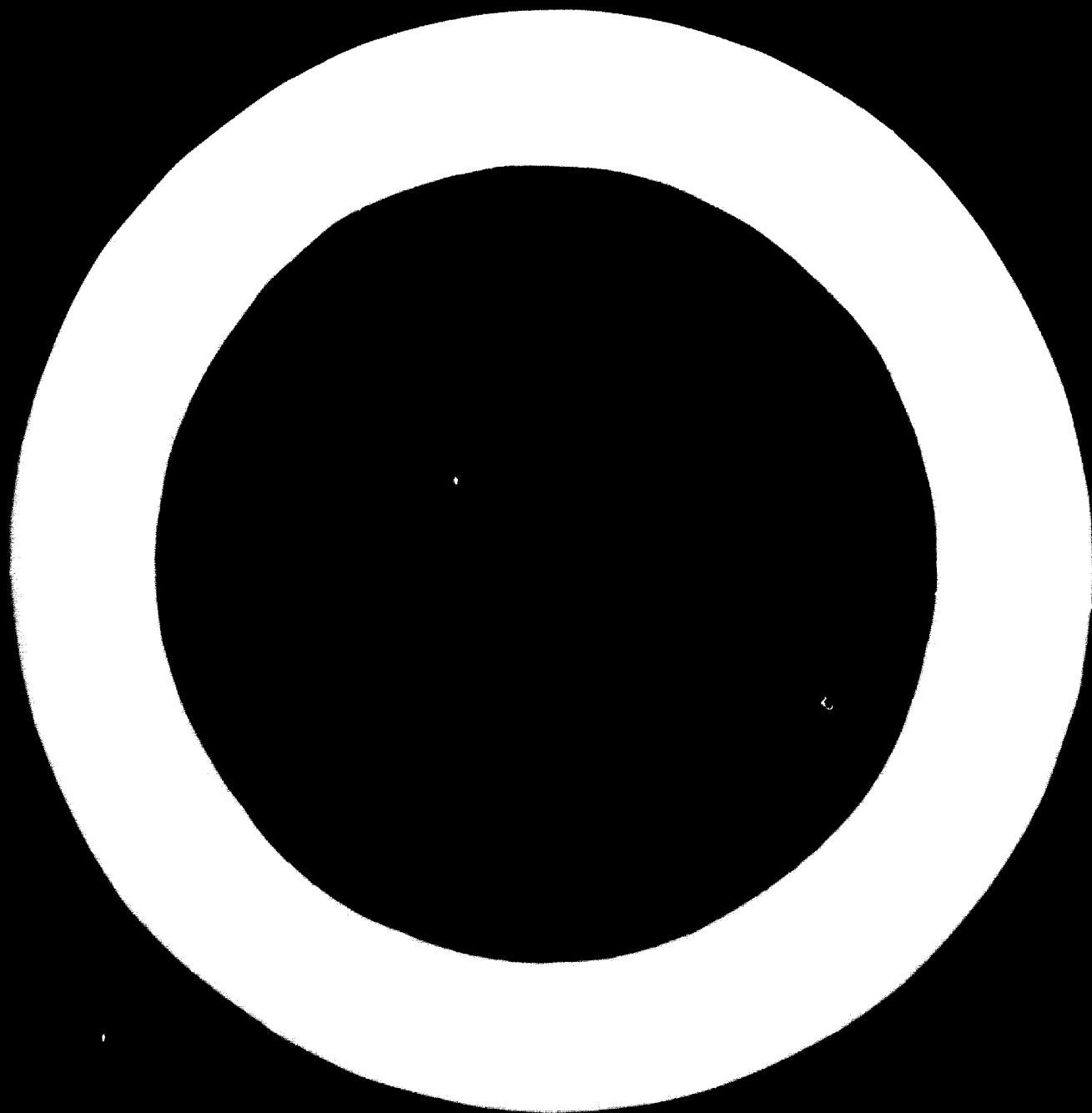
Third Interregional Symposium  
on the Iron and Steel Industry  
Brasilia, Brazil, 14 - 21 October 1973  
Agenda item 10

**DEVELOPMENTS IN THE IRON AND STEEL INDUSTRY AND ITS MARKETS  
IN THE ECE REGION SINCE 1960**

Submitted by

the Economic Commission for Europe

**We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.**



## CONCLUSIONS

1. Against the background of general economic trends in the EC&E region (comprising all of Europe and the United States), a analysis is made in the first section of the paper of trends in steel demand and consumption. Cyclical fluctuations which were characteristic for economic development in western Europe and also in the United States had an impact on steel consumption, but there was not always congruence of general cycles with steel, particularly during the first half of the 1960s, when there was a lack of stability in the relationship between steel use and general economic activity, caused by both short- and long-term factors. Among the short-term factors a prominent place is given in the paper to the existence of excess steel production capacity, leading to competition among producers, consumers' stock cycles, over-staffing, and price falls; among the long-term factors, special emphasis is placed on both economic and technical phenomena which tend to decrease specific steel consumption. A turning point occurred in 1968, when steel demand was increasing simultaneously in western Europe, the United States, Japan, and also in the developing world and soon exceeded supply possibilities. This cycle was, however, rather short and reached its low point as early as 1971. In the United States this instability in overall relationships had already occurred in the mid-1950s, and trends in steel use in the 1960s were smoother than in western Europe. Steel intensity (apparent consumption of steel per US\$ of Gross Domestic Product per capita) was falling there as well as in western Europe.
2. In eastern European countries (including the USSR), steel consumption was increasing at a steady rate during the 1960s and, except for Romania, the upward trend was nowhere interrupted. For the sub-region as a whole, steel use grew from 88 million tons in 1960 to over 150 million tons in 1971, by an annual 5 per cent. Towards the end of the period, a reduction in growth rates occurred, since development strategies place more emphasis on qualitative than quantitative aspects of growth.
3. The sector pattern of steel use did not change significantly during the 1960s: since it is a function mainly of the structure of an economy and the level of development reached, and since such changes are generally a slow process, no major alterations occurred. The product pattern of steel use did, however, change in as much as the familiar trend towards increased use of flat products continued.
4. Trends in steel production largely followed those of consumption, as far as the volume of output is concerned; cyclical fluctuations in production were amplified by those occurring in foreign trade, and rates of capacity use were, particularly in western Europe, not always satisfactory between 1960 and 1967. Important changes took place in the process pattern of crude steel output, where top-blown oxygen converters and electric arc furnaces gain ground at the expense of open-hearths and, particularly, Thomas and Bessemer converters. This trend is rather pronounced in western Europe and the United States, where bottom-blown converters and open-hearths in 1971 accounted only for about one-third of total output (in 1960: close on 90 per cent). The product pattern of finished steel production was also changing in most countries, reflecting the tendency towards increasing use of flat products and of steel tubes, often in applications other than the conducting of liquids and gases.
5. The volume of world trade in steel grew between 1960 and 1970 from about 40 million tons to 85 million tons, or by an annual (compound) rate of 8 per cent; this compares with a 5.6 per cent growth per year of steel production. The vigorous growth of international trade is a clear expression of the

increasing degree of international specialization, which leads to a growing proportion of exchange of steel products rather than their export for covering genuine deficits in supply. The share of domestic production which is exported is, consequently, rising; for western Europe as a whole it was at over 43 per cent in 1971, as compared with 34 per cent in 1969. A considerable part of world steel trade is among the industrialized countries of Europe (about 50 per cent), and trade with North America has also been growing considerably. In recent years, monetary re-alignment has tended to curb some of the price advantages European (and Japanese) exporters had in a number of markets.

6. Trends in domestic prices for steel products are also briefly analysed in the paper. Although list prices do not always reflect the prices actually obtainable (because of rebates, extras, alignment, freight absorption, etc.), it is shown that for most of the 1960s domestic prices remained relatively stable in western Europe and the United States. The renewed upturn of demand in 1968 resulted in increases as from 1970, which are partly also a consequence of general inflationary tendencies. Export prices reflect much more closely the overall demand and supply relationship, and the paper stresses the fluctuations in world market prices (as expressed f.o.b. Antwerp). Very high levels were reached early in 1973, as a result of the rather strained supply situation but also due to upward adjustments following the changes in the external value of the US\$.

7. Supply of the principal iron- and steel-making materials did, in general, not hamper the required expansion of output. There were, of course, periods when short-term bottlenecks occurred as a consequence of spurts in the rate of operation. This was mainly true for scrap, but also, recently for coking coal and coke. While iron-ore prices fell further during the 1960s, and while scrap prices continued to fluctuate, prices for coking coal and coke showed, since 1965, a sharp tendency to rise.

8. The paper shows that the investment behaviour of steelmakers was one of the factors which during certain points of time in the 1960s has contributed in a certain measure to the instability in the relationship between supply possibilities and actual demand for steel products. Data are provided on actual investment expenditure in a number of EEC countries as well as on crude-steel capacity, by regions and selected countries.

9. The survey of developments in the iron and steel industry in the ECE region ends with an assessment of the present situation and an outlook for the remainder of 1973, with a new and strong steel demand boom characterizing the situation. Steel production in western Europe is expected to reach about 175 million tons (6 per cent more than in 1972), in eastern Europe around 177 million tons (+ 4 per cent), and in the United States about 135 million tons (+ 12 per cent). For the world as a whole, close on 680 million tons are likely to be produced, with the developing countries contributing about 29 million tons, 9 per cent more than in 1972. Steel prices are expected to increase further in domestic markets, but export prices would appear to have reached a peak. International trade in steel, which had attained a very high level in 1972, is likely to remain unchanged.

### General economic trends

1. During the 1960s, general economic development in the ECE region<sup>1/</sup> was characterized by continued expansion, reaching in certain countries very high levels of growth. Trends were - as is to be expected - not uniform, both over time and between sub-regions or countries. In industrial western Europe<sup>2/</sup> the post-war reconstruction period (until about 1952) had been followed by a first cycle, which reached its peak in 1955 and its low point in 1958. The ensuing cycle (peak in 1960 and trough in 1967) brought an increase in output (measured in terms of Gross Domestic Product, GDP, at 1963 factor cost) of 4.7 per cent (compound) and of industrial production of 5.4 per cent.<sup>3/</sup> The next cycle was somewhat shorter, attaining its peak in 1969 and its low point in 1971; over its duration GDP grew by an annual 4.7 per cent and industrial production by 5.5 per cent. 1972 was the first year of a renewed upturn, with a relatively modest rate of increase (2.3 per cent in GDP). The period since about 1967 has been characterized by increasing inflationary pressure, which continued also during the downswing phases of the cycle; in certain countries Governmental measures taken to limit inflation were hampering renewed growth.
2. In the socialist countries of eastern Europe, the period of rapid expansion during the 1950s (with growth rate of net material product remaining at as much as 7.6 per cent for seven years) was followed, in the early 1960s by an adjustment phase, with less rapid expansion of output and of capital formation. The ensuing period of accelerated growth lasted to about 1970, with rates of increase in output returning to a level well above 7 per cent a year. The early 1970s were a new period of readjustment, and the planned rates of growth remained somewhat below those of the preceding period.

<sup>1/</sup> Comprising all of Europe and the United States.

<sup>2/</sup> Austria; Belgium; Denmark; Finland; France; Germany, Federal Republic of; Ireland; Italy; Netherlands; Norway; Sweden; Switzerland; United Kingdom.

<sup>3/</sup> Figures on general economic growth from: Economic Survey of Europe in 1971, Part 1, The European Economy from the 1950s to the 1970s, United Nations, New York, 1972.

3. Developments in Greece, Portugal, Spain, Turkey and Yugoslavia showed the typical features of economies in the course of industrialisation, with relatively high growth rates (between 6 and 7 per cent per year) and with less marked cyclical fluctuations. Towards the end of the 1960s, however, the increasing intensity of international trade relationship brought with it the impact of fluctuations abroad on domestic developments.

4. In the United States, the 1960s had been a period of accelerated growth, with GDP (at 1963 factor costs) growing by an annual 4.6 per cent (compared to only 2.8 per cent in the 1950s). The decade was, of course, not free from fluctuations in growth rates: 1962 and 1966 were years of rather higher than average growth, whereas 1961 and 1967 were characterised by relatively small expansion.

#### Development of steel consumption

5. The above, rather summary description of trends in general economic developments in the ECE region provides nevertheless a background against which the evolution of steel consumption in the countries of the area has to be seen.



- 5 -

**Table 1**  
**Apparent consumption of steel in the ECE region,**  
**1960, 1965 and 1970**

Country	1960		1965		1970		rate of growth 1960-1970 (percentage)
	1000 t	kg/cap	1000 t	kg/cap	100 t	kg/cap	
Western Europe, total	94973	267	114489	306	155208	396	5.0
of which:							
Austria	1896	268	2092	288	2936	396	4.4
Belgium-Luxembourg	2410	255	2949	301	4282	477	7.1
Denmark	1261	265	1761	370	2143	436	5.8
France	13689	300	15963	326	23197	457	5.4
Germany, Federal Republic of	28886	521	31608	535	40602	683	3.5
Italy	8989	181	11933	231	21107	393	8.9
Netherlands	3271	285	3969	321	5663	435	5.6
Spain	1584	52	6125	194	9308	277	19.4
Sweden	4100	548	5285	684	5903	734	3.7
Switzerland	1585	296	2045	344	2977	472	6.5
Turkey	611	22	994	32	1908	54	12.2
United Kingdom	22051	420	22975	422	25525	458	1.5
Yugoslavia	1702	92	2455	126	3398	167	7.2
Eastern Europe, total	87689	280	117391	353	151489	435	5.3
of which:							
Bulgaria	854	109	1360	166	2319	273	10.0
Czechoslovakia	6493	476	7368	520	8833	611	3.1
German Dem. Rep.	6032	350	7364	448	8946	525	4.0
Hungary	2079	208	2147	212	3080	298	4.0
Poland	6286	212	8513	270	11682	356	6.4
Romania	2425	169	3875	204	6430	318	10.2
USSR	63520	296	86764	376	110199	454	5.7
Europe, total	182662	274	231880	328	306697	414	5.3
United States	90014	498	128095	658	127222	621	3.5

Source: The Steel Market, several issues, Economic Commission for Europe, Geneva.

Data given in table 1 above show that steel consumption (in terms of apparent consumption, in crude steel equivalents) was growing during the 1960s at 5.0 per cent annually in western Europe, at 5.3 per cent in eastern Europe and at 3.5 per cent in the United States; it will also be seen that - like for general economic trends - growth rates of steel use were higher in the countries of Southern Europe than in industrialized western Europe, where fluctuations in steel use remained a typical feature, as is also brought out by the following annual rates of change for selected countries (percentage change over preceding year):<sup>1/</sup>

	<u>Belgium-Luxembourg</u>	<u>France</u>	<u>Italy</u>	<u>Germany, Federal Republic of</u>	<u>United Kingdom</u>
1961	+ 27.1	+ 2.0	+ 20.8	- 5.6	- 15.4
1962	- 4.3	+ 5.8	+ 12.2	+ 0.9	- 5.1
1963	+ 7.1	+ 4.7	+ 14.4	- 1.7	+ 12.1
1964	+ 22.1	+ 10.6	- 19.9	+ 23.9	+ 19.1
1965	- 22.9	- 6.7	+ 6.9	- 5.6	- 2.7
1966	+ 19.6	- 6.6	+ 17.4	- 4.9	- 8.1
1967	+ 10.5	+ 4.8	+ 20.2	- 6.8	+ 0.9
1968	+ 4.4	+ 0.6	+ 1.9	+ 24.4	+ 9.5
1969	+ 15.3	+ 24.5	+ 9.2	+ 15.0	+ 4.3
1970	+ 1.8	+ 3.9	+ 12.6	+ 1.2	+ 4.9

Although the data given are for apparent consumption of steel only (i.e. they do not take account of changes in stocks held by steel merchants and consumers), which tends to amplify the apparent fluctuations, they still provide an illustration of the instability which was, during the first half of the decade, typical for the relationship between general economic trends and steel consumption: Years of very high increases of steel consumption are followed by sharp drops, while economic development continued to be upward, although at reduced and fluctuating rates.

The lack of stability in the relationship between steel use and overall economic activity which obtained in western Europe for a large part of the 1960ies

<sup>1/</sup> The Steel Market in 1969, Economic Commission for Europe, Geneva 1970.

is ascribed to the influence of both short-term and long-term factors<sup>1/</sup>. Among the short-term factors, a prominent place must be given to the existence at the time of excess steel production capacity, ensuring steel supplies within shorter delivery delays, and giving rise to an anticipation of price falls, to destocking on the part of consumers and to hesitation in the placing of orders. Furthermore, certain important steel consuming sectors were affected by the slow down in general economic activity that lasted until about 1967, and which resulted in a reduced increase of investment activity. The long-term factors which, in addition, exerted their influence comprise the lower specific consumption of steel due to its improved mechanical properties, to trends in industrial design (which became lighter), to rationalisation in steel use, to automation and higher productivity in steel-using sectors. There is, of course, also the growing impact of materials competing with steel, mainly aluminium, plastics, glass, timber, and concrete. Finally, mention must be made of shifts in the industrial structure occurring as economic development reaches higher levels, which may involve greater significance of sectors whose specific steel use per unit of output is lower.

The influence of both short - and long-term factors on steel use is confirmed by figures on steel-intensity (apparent consumption of steel per US-\$ of GDP): In the Federal Republic of Germany it decreased from 0.471 kg in 1960 to 0.301 kg in 1968; in France from 0.222 kg to 0.191 kg; in Sweden from 0.318 kg to 0.270 kg; and in the United Kingdom from 0.312 kg to 0.265 kg.

6. In most countries of western Europe, the year 1968 marks the turning point for steel consumption, as it did for general economic trends: Rates of growth were considerable and, mainly due to stockbuilding, exceeded those of GDP and industrial production. The main feature of this latest steel cycle which reached its low-point in 1971 was that it coincided almost entirely with the general economic cycle. This congruence can partly be ascribed to the adaptation of steelmakers' production and sales policy to the changing over-all demand situation; it was, however, mainly caused by steel consumers

---

<sup>1/</sup> See also The European Steel Market in 1962, Economic Commission for Europe, 1963, page 13 st seq.

starting to deplete stocks at a relatively early point of time, and this stock cycle was further shortened by steel producers' supply policies.

7. The overall development of steel in the 1960s in the United States was rather similar to that shown for western Europe, although the amplitude of fluctuations was less, the upward trend of steel consumption was only interrupted for two years in the 1960s (1961 and 1967), compared to, for instance, five years in the Federal Republic of Germany. The instability in the relationship between steel consumption and general economic trends which prevailed in western Europe during most of the 1960s had occurred in the United States already during the mid-fifties, caused by the same factors mentioned above for western Europe, and the phase of adaptation of steel use and production in the United States to the new situation was terminated in the first years of the 1960s. One of the results of this adaptation is that present steel consumption in the United States is indeed not much above the levels obtaining in the mid-1950s, as will also be seen from the following figures on per capita steel use (kilogrammes per capita):

<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1971</u>
616	597	564	431	492	498	658	621	617

8. Eastern European countries (including the USSR) have between 1960 and 1970 increased their steel consumption at a steady rate; with the exception of Romania (for 1965 and 1968) the upward trend was nowhere interrupted. For the region as a whole the volume of apparent consumption developed as follows (millions of tons):

<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
87.7	94.2	101.3	104.3	110.3	117.4	124.3	132.1	138.4	145.1	151.5	151.3

The new strategy of development which was adopted towards the end of the 1960s in most of the socialist countries has brought a reduction in the rate of growth of steel consumption, since it places more emphasis on qualitative aspects of economic growth rather than on quantitative aspects. Furthermore and as part of this new strategy, sectors such as chemicals, textiles, food-processing and petro-chemical industry are gaining in importance, where specific steel consumption is less than for infra-structure building or for the establishment of heavy industries. In the industrially more advanced countries of the region steel intensity has also shown signs to decrease (apparent steel

consumption per unit of net-material product): from 0.322 kg in 1960 to 0.299 kg in the USSR, from 0.534 kg to 0.565 kg in Czechoslovakia, from 0.231 kg to 0.212 kg in Romania.

Trends in the sector and product pattern of steel consumption

9. Due to the absence of statistics on actual consumption of steel by principal sectors it is very difficult to make an assessment of trends in the pattern of steel use during the past twelve years or so. An estimate made by the ECE Secretariat for industrialized countries showed the following sector distribution of steel use (percentages)<sup>1/</sup>

<u>Sector</u>	<u>Percentage share</u>
Mining, railways, permanent construction	26
Manufacture of metal products	20
Engineering industries	19
Manufacture and repair of transport equipment	22
Other metal manufacturing	12
Other consumers	<u>1</u>
Total	100

10. Estimates made on the same subject by the Japan Iron and Steel Federation in 1971 show a somewhat different picture<sup>2/</sup>, due mainly to different coverage of the individual sectors and to a different product range included. They are, nevertheless reproduced below, because they permit a comparison over time and between countries (percentages of total steel consumption):

<sup>1/</sup> Aspects of competition between steel and other materials, Economic Commission for Europe, New York, 1966, page 100.

<sup>2/</sup> Published in Metal Bulletin, London, 3 August 1971, page 29.

<u>Sector</u>	<u>Japan</u>		<u>United States</u>		<u>Germany, Federal Republic of</u>		<u>United Kingdom</u>	
	<u>1963</u>	<u>1969</u>	<u>1963</u>	<u>1969</u>	<u>1963</u>	<u>1969</u>	<u>1963</u>	<u>1969</u>
Construction	48.9	49.2	21.8	25.0	39.0	39.1	34.6	29.2
Motor-vehicles	10.6	12.9	27.3	24.0	15.2	15.0	15.1	14.4
Railway rolling stock	2.5	1.5	3.2	3.4	1.9	1.6	1.2	0.8
Engineering	10.2	11.3	13.4	15.9	13.9	13.7	14.9	21.0
Electrical engineering	5.4	4.2	4.6	4.1	5.4	5.0	5.4	5.2
Shipbuilding	7.7	8.8	0.7	0.8	2.4	3.5	2.8	2.8
Metal containers	5.0	4.2	9.1	8.3	11.3	11.4	6.1	5.9
Other consumers	9.7	7.9	6.4	8.5	10.9	10.7	15.9	20.7

As will be seen the share of individual sectors within a country changes very little; this is to be expected since structural change in an economy is normally a slow process. The differences obtaining between countries are, of course, due to the different weight of individual sectors: Motor-vehicles are a much more significant outlet for steel in the United States than in any of the other countries, whereas construction is more important in Japan, as well as shipbuilding; the United Kingdom steel use in the engineering industries presents a higher share of the total than in other countries, etc.

11. The product pattern of steel use has undergone more considerable changes than the sector pattern. The emphasis is more and more on the use of flat products, as will also be seen from the following figures, comparing the situation in the mid-1950s with that at the end of the 1960s and the early 1970s (percentages of total use):

<u>Country</u>	<u>1957/1957</u> (average)	<u>1967/1969</u> (average)	<u>1971</u>
Germany, Federal Republic of	39	54	54
France	44	49	50
United Kingdom	48	55	55
United States	62	63	63
Czechoslovakia	32	31	35
Poland	30	38	40
USSR	31	37	39

Source: Calculated from data in the Quarterly Bulletin of Steel Statistics for Europe, United Nations, Geneva, several issues.

It would seem that a proportion of over 60 per cent of flat products in total use is about the maximum that present technology of steel use requires in a fully industrialized country, like the United States, where the production of motor-vehicle and consumers' durables is a major destination for steel.

The figures shown for industrialized western European countries show a trend in this direction; in eastern Europe the share is also increasing, but due to the prominent place still held by the construction sector in their economies the share of flat products is still at a distance from that obtaining in certain western European countries and in the United States.

12. In a discussion of steel consumption trends, consideration should also be given to the origin of steel consumed in individual countries and regions. As is well known the steel industry has been always characterized by a high degree of international division of labour, and the trend towards further international specialisation has during the 1960s further strengthened. Apart from reasons of comparative advantage in the production of different types of products which are the ordinary cause of international exchange, mention must be made of the trend towards ever increasing optimum capacity of steel production installations, and the desire to extend mill-runs beyond the consumption capacity of the domestic market alone, by exporting. This situation is reflected in growing shares of imported steel in apparent consumption, as is also illustrated by the figures in table 2 below.

Table 2

Share of imported steel in apparent consumption, by regions and selected countries

1960, 1965, 1971  
(percentages)

<u>Region or country</u>	<u>1960</u>	<u>1965</u>	<u>1971</u>
Total western Europe	25.0	28.4	37.3
of which:			
Belgium-Luxembourg	31.1	46.8	57.1
Germany, Federal Republic of	17.3	22.8	35.1
France	27.3	30.1	39.4
Italy	24.8	20.2	27.4
Sweden	38.2	34.9	39.3
United Kingdom	7.1	3.3	12.9
Total eastern Europe	9.3	9.0	10.2(1970)
of which:			
USSR	3.2	2.6	3.9
Bulgaria	75.5	66.9	60.5
Czechoslovakia	13.1	20.1	10.8
Poland	9.0	7.9	14.0
United States	4.0	9.4	11.5

Source: Calculated from figures in Quarterly Bulletin of Steel Statistics for ECEEC, United Nations, Geneva, several issues.

The progress in the proportion of imported steel consumed in individual countries is obvious; the differences which obtain geographically are interesting: in general, large producing countries, like the United States and the USSR, import a relatively small part of their steel requirements, whereas smaller countries and those which are members of economic groupings (like the EEC) rely to a considerable and increasing extent on imported steel. The relatively small figures shown for the United Kingdom show that imports of steel into that country have been traditionally low since domestic prices were at a low level. The relatively small proportions given for eastern European countries as a group are due to the statistical weight of the USSR in the total.



Trends in steel production and trade

(a) General developments

13. The overall trend and level of steel production in the ECE region since 1960 followed the development in demand and consumption, as is also brought out by the figures given below. A comparison of the growth rates reveals however that in western Europe steel consumption grew faster over the period 1960 to 1970 than production (5 per cent and 4 per cent, respectively); this was also true for the United States (3.5 per cent and 2.8 per cent, respectively), whereas in eastern Europe production increased at a higher rate than steel use (6.1 per cent and 5.3 per cent respectively). In other words: Net-exports from western Europe were shrinking between 1960 and 1970, from about 14 million tons (crude steel equivalent) to 6.7 million tons; the United States have become a net-importer of steel (8.2 million tons in 1970, crude steel equivalent); and eastern European countries have changed from being net-importers (of 1.2 million tons, crude steel equivalent) to net-exporters (of about 4 million tons).

**Table 3**  
Crude steel production in the ECE region  
1960, 1965, and 1970

Country	1960 1000 t	1965 1000 t	1970 1000 t	Compound rate of growth 1960-1970 (percentages)
Western Europe, total	108 969	129 612	161 981	4.0
of which:				
Austria	3 163	3 221	4 079	2.6
Belgium- Luxembourg	13 263	13 747	18 070	4.8
Denmark	317	432	473	1.4
France	11 293	19 601	23 773	3.2
Germany, Federal Republic of	34 100	36 871	45 621	2.8
Italy	8 229	12 683	17 277	7.7
Netherlands	1 942	3 115	5 830	10.0
Spain	1 520	3 515	7 420	14.5
Sweden	3 213	4 727	5 497	5.5
Switzerland	275	347	524	6.6
Turkey	280	586	1 520	18.4
United Kingdom	24 695	27 410	28 316	1.4
Yugoslavia	1 442	1 769	2 228	4.4
Eastern Europe, total,	86 472	119 606	155 595	6.1
of which:				
Bulgaria	253	588	1 800	21.7
Czechoslovakia	6 768	8 598	11 480	5.4
German Democratic Republic	3 787	4 366	5 053	2.9
Hungary	1 886	2 520	3 110	5.1
Poland	6 680	9 088	11 749	5.8
Romania	1 806	3 425	6 517	13.7
USSR	65 292	91 021	115 886	5.9
Europe, total	195 441	249 218	317 576	5.0
United States	90 068	118 985	119 140	2.8
Total World	285 509	368 203	436 716	5.6

Source: The Steel Market, several issues.

14. In western Europe, steel production was characterized during the 1960s by fluctuations which were similar to those discussed further above for steel consumption. The reasons for these rather abrupt changes were largely identical with those given already: Instability in actual use of steel, due to cyclical and long-term changes in the steel using sectors of the economies; changes in the level of stocks held by consumers. Among the factors influencing the level of steel output, however, mention must be made of two additional phenomena: One was the fluctuation in orders for steel received by steelmakers, and the other was certainly the investment policy pursued by the steel industry itself. This led at times during the decade to rather low rates of capacity use, later to over-production and keen competition on the world market and also on the domestic markets of the principal producers; it had an adverse effect on prices and profits, and hampered at times adequate expansion and modernization of the western European steel industry. As from about 1967/1968 the situation changed, since steel makers had adapted the rate of capacity expansion to the actual growth of steel requirements and practiced a certain measure of co-ordination of investments. The boom in demand which started at that point had also a favourable influence, in as much as it made over-capacity dwindle away within a relatively short time; in fact, demand was as from 1970 rapidly overtaking western European production possibilities. This led to a new record level of investment expenditure: The (six) countries of the ECSC, for example, had spent in 1967 750 million US-\$ on new plant and equipment for the steel industry; by 1971 this had increased to 2500 million US-\$. The ensuing period of slackening demand (in 1970 and most of 1971) brought once more a phase of low rates of capacity use, without, however, resulting in ruinous competition and price falls; this was ascribed to measures taken by steel makers in western Europe to adjust the rhythm of output to that of incoming orders.

(b) Trends in the general pattern of crude steel production

15. One of the main innovations in recent steel-making technology was the top-blown oxygen converter (LD converter; basic oxygen furnace). Although it had become operational already during the early 1950s, its large-scale application only took place during the 1960s. This delay is to some extent characteristic for the iron and steel industry: The high capital costs involved compel steelmakers to operate equipment over a long time, and often the actual adoption of new processes only takes place when capacity is being

expanded to keep up with rising demand. This is particularly valid for crude steelmaking processes. In the case of oxygen-steelmaking which is more pig-iron intensive than the earlier pre-dominant open-hearth process the adoption of the new method involved an additional expansion of blast-furnace capacity and, thus, additional investment expenditure. While the introduction of top-blown oxygen converters was hesitant during the 1950s (western Europe produced in 1955 217 000 tons of oxygen-blown steel, or 1.1 per cent of total output), the 1960s brought rapid expansion of the application of the process, as will also be seen from the figures shown below in table 4. In western Europe the proportion of oxygen-blown steel advanced from 3.3 per cent in 1960 to over 20 per cent in 1965 and to close on 50 per cent in 1971.

16. The other process which has increased in importance is the electric furnace (11 per cent for western Europe in 1960, nearly 18 per cent in 1971). This is mainly ascribed to the increasing demand for quality steel, and also to the need to use good quality scrap arising in steel plants where mainly flat products are made from oxygen-blown steel. The share of Thomas and Bessemer converters and those of the open-hearth decreased in western Europe correspondingly and (since 1965 for open-hearths, and since 1960 for bottom-blown converters) also in absolute terms.

Table 4  
Trends in the process pattern of crude steel production in selected countries  
1960, 1965 and 1971

	Total crude steel production (thousands of tons)			Thymar (%)			Bessemer (%)			Open-hearth (%)			Electrical steel (%)			Oxygen-blown (%)			Other (%)			
	1960	1965	1971	1960	1965	1971	1960	1965	1971	1960	1965	1971	1960	1965	1971	1960	1965	1971	1960	1965	1971	
	Belgium	7 179	9 162	12 444	85.0	75.3	34.5	0.3	0.2	0.1	8.5	4.2	1.9	6.2	4.5	3.6	-	15.8	59.7	-	-	-
Luxembourg	4 084	4 585	5 241	96.0	88.1	60.7	-	-	-	-	-	-	2.0	1.2	1.2	-	10.7	38.1	-	-	-	-
France	17 279	19 604	22 959	60.6	53.0	35.5	0.6	0.5	0.3	29.7	24.4	16.5	8.6	9.0	10.6	0.5	13.1	37.1	-	-	-	-
Italy	8 229	12 581	17 452	5.5	-	-	-	-	-	55.9	44.6	22.9	38.6	37.4	40.5	-	22.0	36.3	-	-	-	6.0
Netherlands	1 942	3 145	5 083	-	-	-	-	-	-	56.8	24.3	14.1	10.5	6.6	6.9	32.7	69.1	79.0	-	-	-	-
Germany, Federal Republic of	34 100	36 821	40 313	43.7	29.4	7.0	0.2	0.1	0.0	47.2	42.9	21.2	6.4	8.5	10.0	2.5	19.1	61.8	-	-	-	-
Total EEC	72 813	85 998	103 392	49.3	37.4	17.8	0.3	0.2	0.1	37.8	31.2	16.0	10.4	12.0	14.3	2.2	19.2	51.5	-	-	-	0.0
Austria	3 163	3 221	3 960	-	-	-	-	-	-	31.3	26.1	16.4	12.6	12.8	11.5	56.1	61.1	72.1	-	-	-	-
Denmark	317	412	471	-	-	-	-	-	-	94.0	94.2	96.3	6.0	5.8	3.8	-	-	-	-	-	-	-
Finland	273	368	1 025	-	-	-	0.4	2.5	-	28.2	31.8	10.6	71.4	65.7	24.0	-	-	65.2	-	-	-	-
Norway	478	686	863	-	-	-	44.8	-	-	-	-	-	55.2	58.7	55.2	-	-	44.8	-	-	-	-
Portugal	-	273	412	-	-	-	-	-	-	-	-	-	-	14.3	19.2	-	-	80.8	-	-	-	-
Spain	1 920	3 515	7 794	-	-	-	3.9	6.6	-	70.8	51.5	21.3	15.3	30.2	34.0	-	11.7	44.6	-	-	-	-
Sweden	3 218	4 725	5 253	12.6	7.9	0.5	1.1	-	-	33.9	32.2	22.6	48.5	38.1	40.2	3.9	21.8	36.7	-	-	-	-
Switzerland	275	347	532	-	-	-	-	-	-	-	-	-	100.0	100.0	100.0	-	-	-	-	-	-	-
Turkey	280	451	-	-	-	-	-	-	-	99.6	97.8	-	0.4	2.2	-	-	-	-	-	-	-	-
United Kingdom	24 695	27 440	24 175	6.9	2.1	-	1.2	1.0	1.0	84.5	63.7	42.1	6.9	12.7	18.1	0.5	30.2	38.7	-	-	-	0.3
Yugoslavia	1 442	1 769	2 453	-	-	-	-	0.2	-	91.7	86.9	67.7	8.3	12.9	22.3	-	-	10.0	-	-	-	-
Total western Europe	108 874	129 199	150 960	35.0	25.6	12.3	0.9	0.5	0.2	49.4	39.5	21.6	11.4	14.2	17.5	3.3	20.1	48.2	-	-	-	0.1
Bulgaria	250	586	1 948	-	-	-	-	-	-	90.0	83.3	25.6	10.0	16.7	20.3	-	-	54.1	-	-	-	-
Czechoslovakia	6 768	8 298	12 069	3.6	2.8	-	-	-	-	84.5	83.7	-	11.9	13.5	-	-	-	-	-	-	-	-
German Democratic Republic	3 787	4 430	-	10.0	8.7	-	-	1.7	-	74.9	75.9	-	13.2	13.7	-	-	-	-	-	-	-	-
Hungary	1 886	2 530	3 110	-	-	-	-	-	-	90.1	92.3	90.6	9.9	7.7	9.4	-	-	-	-	-	-	-
Poland	6 680	9 088	12 686	-	-	-	-	-	-	92.0	91.9	74.6	7.7	7.7	7.9	-	-	13.3	-	-	-	0.4
Romania	1 086	3 420	6 803	-	-	-	-	-	-	89.1	91.1	60.9	10.9	8.9	9.3	-	-	13.2	-	-	-	-
U.S.S.R.	65 292	91 000	120 637	-	-	-	2.9	2.4	1.0	84.4	83.4	10.3	6.9	10.0	9.5	3.8	4.2	13.3	-	-	-	-
Total eastern Europe	86 469	119 644	168 455	0.7	0.5	-	2.3	1.9	-	84.8	84.2	-	9.3	10.1	7.8	2.1	3.1	13.3	-	-	-	6.0
United States	90 068	115 371	169 058	-	-	-	1.2	0.5	-	83.0	71.8	-	5.4	10.7	11.1	3.0	11.4	33.4	-	-	-	-

SOURCE: Quarterly Bulletin of Steel Statistics for Europe, several issues.

17.

Trends in eastern Europe were rather similar, although the advance of the top-blown oxygen converter in that area is somewhat less rapid than elsewhere; the open-hearth still keeps its leading position, and oxygen converters are only being gradually introduced as new capacity is required. In the USSR, 66 million tons of open-hearth steel were still produced in 1972 (69 per cent of the total), oxygen converters accounting for 26 million tons, or 21 per cent of total output; in 1960 the respective shares were 84 per cent and 9 per cent.

18. In the United States basic oxygen furnaces (BOF) produced in 1971 53.2 per cent of total crude steel output, compared to only 3 per cent in 1960. This was mainly at the expense of open-hearth production which is decreasing rapidly in both absolute and relative terms, as old furnaces are being phased out. Electric steel also advances in the United States, for the same reasons as given further above.

(c) Trends in the product pattern of finished steel production

19. Like for steel consumption, the essential feature of developments in Europe since 1960 is the trend towards an increasing share of flat steel products; the rate of increase in output of tubes, which is faster than that for hot-rolled finished steel products in general, also indicates that steel tubes are increasingly being required by industrialised economies, often in applications other than the conducting of liquids or gases. This is also brought out by the figures shown below in table 5.

**Table 2**  
**Production of finished steel products in selected countries,**  
**1960, 1965 and 1970**

Region or country	Year	Total, hot-rolled products	of which (%)		Steel tubes
			Flat products	Sections	
<b>Western Europe, total</b>	1960	83 640 (100)	42.1	31.9	5967
	1965	100 437 (100)	44.3	31.0	7578
	1970	127 709 (100)	47.0	29.6	10593
<b>of which:</b>					
<b>Belgium</b>	1960	5 880 (100)	36.7	33.4	182
	1965	7 724 (100)	40.2	33.0	244
	1970	10 264 (100)	49.2	33.2	277
<b>France</b>	1960	13 700 (100)	45.2	31.5	1064
	1965	15 724 (100)	45.1	30.4	1306
	1970	18 727 (100)	46.3	29.3	1790
<b>Germany, Federal Republic of</b>	1960	25 841 (100)	39.8	30.9	2033
	1965	28 476 (100)	42.1	27.9	2598
	1970	35 974 (100)	49.0	24.6	3622
<b>United Kingdom</b>	1960	18 411 (100)	48.7	30.9	1343
	1965	20 770 (100)	52.2	28.7	1341
	1970	22 180 (100)	55.2	25.5	1663
<b>Eastern Europe, total</b>	1960	59 478 (100)	32.5	40.0	7434
	1965	81 823 (100)	35.2	37.9	11414
	1970	110 124 (100)	..	..	..
<b>of which:</b>					
<b>USSR</b>	1960	44 806 (100)	33.2	40.0	5805
	1965	61 600 (100)	38.1	38.2	9000
	1970	82 142 (100)	39.0	38.5	12434
<b>Czechoslovakia</b>	1960	4 491 (100)	23.3	44.3	629
	1965	6 094 (100)	27.4	41.1	895
	1970	7 590 (100)	37.3	38.3	1133
<b>Poland</b>	1960	4 685 (100)	37.0	35.8	366
	1965	6 419 (100)	39.4	34.0	498
	1970	8 401 (100)	39.5	33.0	711
<b>United States</b>	1960	64 546 (100)	64.4	22.3	6398
	1965	90 088 (100)	64.3	22.3	8111
	1970	82 372 (100)	60.6	22.7	7036

**SOURCE:** Quarterly Bulletin of Steel Statistics for Europe, various issues.

20. It is evident that - like for steel consumption - the share of flat products is highest in the United States (above 60 per cent); in western Europe the proportion has been progressing over the 1960s and is, for the area as a whole now approaching the 50 per cent mark. In eastern Europe, the share of flats in the total has also been growing and is moving towards 40 per cent; the share of heavy and light sections is, however, still rather high and only slowly falling, due to the importance of construction, in the field of infrastructure (bridges, roads and railways) as well as in industrial construction (new factories). The figures also bring out the increasing significance of tubes, with the USSR as the most prominent producer (establishment of pipeline network in eastern Europe).

**(d) Trends in foreign trade**

21. The volume of world trade in steel grew between 1960 and 1970 from 39.5 million tons to 84.9 million tons, or by an annual (compound) rate of 8 per cent; crude steel production increased during the same period from 346 million tons to 595 million tons, or by 5.6 per cent annually (compound). This relatively vigorous growth of international trade in steel is a clear expression of the growing degree of international specialisation in the iron and steel field which leads to a growing proportion of exchange of steel products rather than their export for reasons of covering genuine deficits in supply; a further reason for the extraordinary growth of steel trade is that, at times particularly during the 1960s, the practice of steelmakers to charge lower prices for exported steel than for products delivered domestically led to an increased demand for foreign produced steel.

22. As will also be seen from the figures given below, the role of western European steel makers as international suppliers has decreased considerably in importance since 1960 (thousands of tons and percentages):

	1960		1965		1970	
	1000 t	%	1000 t	%	1000 t	%
<b>Volume of world trade</b>	39485	100	59101	100	84900	100
<b>Share of:</b>						
western European countries	28238	71.6	39497	61.7	43668	51.4
eastern European countries	4926	12.5	9520	16.1	14284	16.8
United States	2710	6.9	2277	3.9	6424	7.6
Japan	2242	5.7	9544	16.1	17599	20.7



Although western Europe still preserves its position as the world's most important supplier, its share has decreased considerably. This is mainly due to the increasing importance of Japan, but also to the growing exports from eastern European countries: the high figure shown for 1970 for the United States is exceptional, since in that year the steel boom in western Europe resulted in increased demand for United States produced steel not only in western Europe but also in other areas, particularly in Latin America.

23. From the figures given below it will be clear that the main driving force behind the growth of western European exports was indeed the trade between neighbouring countries, within economic groupings, who are often partners at similar stages of economic growth and industrialization (thousands of tons and indices):

Pattern of European trade in steel

	<u>1960</u>	<u>1965</u>	<u>1970</u>
<u>Total exports of western Europe</u>	23 238 (100)	39 497 (140)	43 648 (155)
of which:			
to western Europe	16 317 (100)	22 582 (138)	31 779 (195)
to eastern Europe	2 093 (100)	1 148 (55)	2 039 (97)
for other regions	9 828 (100)	15 767 (160)	9 850 (100)
<u>Total exports of eastern Europe</u>	4 926 (100)	9 520 (193)	14 284 (290)
of which:			
to eastern Europe	3 154 (100)	5 994 (190)	7 334 (233)
to western Europe	683 (100)	1 367 (200)	2 716 (398)
to other regions	1 089 (100)	2 159 (198)	4 234 (389)

The expansion of the volume of trade between EUSC countries was even more important than the 95 per cent increase shown for western Europe as a whole: It grew from 9.6 million tons in 1960 to over 20 million tons in 1970, or by 108 per cent. For eastern Europe, the growth in over-all exports was characterized by an increase in significance of markets outside the region, particularly in western Europe; exports outside the region were in 1970 almost at the level of trade with other eastern European countries. Trade between eastern and

western Europe has, between 1960 and 1970 increased at a much lower rate than those noted for trade flows of both sub-regions with other regions; it grew from 2.8 million tons to 4.8 million, entirely as a result of increased exports from eastern to western Europe. Western Europe's shipments to eastern Europe have been stagnating and even falling during the 1960s; only more recently was there an increase due to a slow but general improvement in overall trade relationships.

24. As far as trade between Western Europe and North America is concerned, it has developed as follows (thousand tons):

<u>Exports of</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>
Western Europe to North America	2109	5565	5353
North America to western Europe	1200	434	664(1971)

These figures reflect an important phase of world trade in steel which is, most probably, coming to an end: Quite apart from the genuine comparative advantage western European countries may have had in production, and hence in export to the United States of certain products, the disparity in the relationship between the US-\$ and certain western European (and Japan's) currencies created an additional price advantage for imported over domestically produced steel in the United States; the monetary realignment that has set in some time ago has made shrink considerably the price advantage of European and Japanese exporters. Conversely: many types of steel produced in North America were too expensive to reach the western European market; this possibility has improved after revaluation of certain European currencies, the devaluation of the US-\$ and after a strong upward movement in western European steel prices.

25. Western Europe's exports to other regions are much less important than those to North America as will be seen from the following figures (thousand tons):

<u>Exports of western Europe to</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>
Africa	1575	2126	1973
Latin America	1952	1476	1225
Far East	2099	1345	1306

Exports to Latin America and the Far East have been falling since 1960. The reason is that, on the one hand, many countries in both regions have in the meantime started to operate their own steel plants which permits them to substitute domestic products for imported ones; on the other hand, the

advance of Japan as a supplier of steel in the Far East and also in Latin America has been considerable over the last decade.

26. The product pattern of world trade in steel has, since 1960, not undergone very significant changes; these had taken place mainly in the 1950s, as is also brought out by the figures shown below (percentages):

<u>Product</u>	<u>1950</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>
Ingot and semi	8.4	14.2	14.9	16.8
Railway-track material	8.2	3.9	2.6	1.8
Heavy and light sections	31.7	25.0	25.1	20.6
Wire rods	4.1	4.7	6.1	5.8
Strip	4.7	5.1	3.7	3.5
Plates and sheets	21.7	29.3	31.7	35.3
Tubes and fittings	11.1	9.6	9.9	10.6
Wire	3.4	3.0	2.4	2.1
Timplate	5.3	4.6	3.1	3.1
Wheels, tyres and axles	1.4	0.6	0.5	0.4
Total	100	100.0	100	100

Like for production and consumption the share of flat products is increasing (from 34.4 per cent in 1960 to 38.8 per cent); this figure remains somewhat below the proportion this type of product holds in steel consumption since the item "ingots and semi", which is also growing, comprises a good deal of hot-rolled coils of flat products. The behaviour of "tubes and fittings" is also noteworthy; the percentage shown for 1970 is not very different from that noted for 1950, since these products were then typical "deficit-products" whose production was not far developed in many countries which were important consumers; by 1970 trade in tubes had changed in character in as much as it comprises now a considerable measure of exchange of specialities.

27. Before concluding the present section dealing with trends in foreign trade in steel a word should be said about the increasing dependence of production in many countries, particularly in western Europe, on foreign demand.

Table 6

Share of exported steel in domestic production,  
by regions and selected countries, 1960, 1965 and 1971

(percentages)

<u>Region or country</u>	<u>1960</u>	<u>1965</u>	<u>1971</u>
Total western Europe	34.4	36.8	43.2
of which:			
Belgium-Luxembourg	85.3	88.6	88.9
Germany, Federal Republic of	30.0	33.7	42.8
France	42.4	43.1	43.7
Italy	17.8	24.9	23.9
Sweden	21.3	27.2	36.9
United Kingdom	17.1	19.0	27.2
Total eastern Europe	8.1	10.6	12.6(1970)
of which:			
USSR	5.9	7.1	8.1
Bulgaria	16.2	23.5	37.1
Czechoslovakia	16.7	30.7	38.1
Poland	14.9	13.7	15.4
United States	4.1	2.4	2.0

SOURCE: Calculated from Quarterly Bulletin of Steel Statistics (Geneva, United Nations, Geneva, several issues).

It will be seen from figures in table 6 that the export dependence of domestic output is growing in almost all countries; the reasons are those shown further above for the increase in the proportion of consumption met from imports: Growing international exchange of steel products, is whose production the trading partners have a comparative advantage. The very high proportion shown for Bulgaria is probably a temporary phenomenon since new production capacity is used for export as domestic possibilities to use steel have not as yet been increased accordingly. The falling ratio of exports to production for the United States is explained by the unfavourable over-valuation of the US-\$ which made export prices for many types of steel and for a certain time prohibitive.

### Trends in prices of steel products

28. The developments in demand and supply of steel outlined in the foregoing are only vaguely reflected in the trends of domestic prices given in table 7 below for western European countries. The reason is that, while list prices remained almost unchanged also during the years of fierce competition, rebates were granted and a considerable amount of sales on the home market were carried out by alignment to the lower prices of imported steel. If the long-term movement of list prices is considered, it would seem that for the eleven year period covered the increase seems relatively moderate, at between 2 per cent and 4 per cent per year (compound), which remains well below the now generally accepted rates of price inflation. It should also be noted that between 1960 and 1967 there was very little upward movement of steel prices, and that most of the increases (partly due to changes in exchange rates) were taking place during the last five years.

29. Export prices are a more accurate measure of the actual demand-supply relationship, and the f.o.b. Antwerp prices for export of steel from western Europe reflect very closely the situation of the steel market. After the first change from a "sellers'" to a "buyers'" market which had occurred around 1957, export prices had in 1960 for the first time shown an upward movement. The difficulties which had characterized the steel market, and which had brought an extended period of strong competition led to a downward trend of prices, which only ended in early 1969 when a new steel demand boom started. The ensuing period of slackening demand in 1971 is well brought out by the figures, and the renewed upswing in 1972 is also visible. The very high levels of export prices shown for March 1973 are only partly caused by the rather strained supply situation; they are to a certain extent caused by upward adjustments due to the change in February 1973, of the US-\$ exchange rates.

**Table 7**  
**Development of domestic prices for iron and steel products, in selected countries, 1960 to 1970**  
 (Excluding taxes in US dollars per ton)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
<b>MERCHANT BARS</b>												
Belgium	99	104	102-104	95-104	95-104	96-98	96-110	92-110	94	(90)	138-141	134-140
France	82.40	-	89.30	96.60	96.60	96.60	96.60	96.60	96.60	(95.80)	106.00 <sup>2/</sup>	122.30
Germany, Fed. Rep. of	99	99.20	104.15	104.15	104.15	104.15	104.15	104.15	106.50	(98.75)	116.10	130.20
United Kingdom	104.05-111.85	100.15-107.90	101.20-109	105.45-110.55	105.45-110.55	117.35	119.05	124.55	106.75	106.75	113.60	133.70
United States	121.25-125.10	121.25-125.10	121.25-125.10	121.25-125.10	125.65-130.60	130.60	130.60	129.50	132.95	139.40	147.15	157.10
<b>HEAVY SECTIONS</b>												
Belgium	107	107	99-107	99-107	99-107	99-107	90-99	93-99	93-99	93	164-168	140
France	83.40	90.40	92.95	97.75	97.75	97.75	97.80	97.80	97.80	99.25	111.95 <sup>2/</sup>	130.45
Germany, Fed. Rep. of	96.90	96.90	101.75	101.75	101.75	101.75	101.75	101.75	100.25	(97.75)	129.80	135.70
United Kingdom	104.40	99.60	100.60	104.90	104.90	110.25	112.00	117.10	100.40	100.40	107.25	124.70
United States	121.25	121.25	121.25	121.15	121.25	125.65	125.65	128.95	128.95	136.65	144.40	152.10
<b>HEAVY PLATES</b>												
Belgium	122	122	102-122	110-122	95-122	107-122	89-122	102-122	102-122	106-122	163-165	163-165
France	97.25	102.70	102.70	109.65	109.65	109.65	109.65	109.65	109.65	(107.60)	133.70 <sup>2/</sup>	(126.70)
Germany, Fed. Rep. of	106.50	106.50	111.85	111.85	111.85	111.85	111.85	111.85	110.40	(100.40)	148.90	148.90
United Kingdom	111.20	106.40	107.50	110.95	110.95	115.75	117.50	122.30	104.80	104.80	114.55	133.80
United States	116.85	116.85	116.6	116.85	122.35	122.35	122.35	122.35	126.75	134.45	142.20	149.90
<b>COLD-ROLLED SHEETS</b>												
Belgium	150.30	150.30	150.30	150.30	150.30	150.30	149.30	149.30	151.90	151.90	170-174	170-174
France	129.35	135.20	135.20	142.30	142.30	142.30	135.20	135.20	132.90	131.70	137.35 <sup>2/</sup>	158.15
Germany, Fed. Rep. of	153.85	153.85	154.30	154.30	154.30	154.30	154.30	154.30	143.25	(130.75)	168.00	176.80
United Kingdom	137.95	137.95	139.40	147.75	147.75	147.75	147.70	154.95	132.50	132.50	134.65	155.90
United States	154.85	154.85	154.85	154.85	160.40	143.85	143.85	147.15	152.65	158.70	167.55	197.30

**Notes:** These prices, valid in January of each year, are not strictly comparable between individual countries, they are internal prices less taxes for Thomas-quality steel, for Belgium, France and the Federal Republic of Germany; for the United Kingdom and the United States they refer to open-hearth quality steel.

- Figures in brackets represent list prices minus rebates.

<sup>2/</sup> Change in product definitions and therefore in prices.

Development of "actually obtainable prices" of iron and steel  
products for export, F.O.B., Antwerp  
(yearly averages, US-\$ per ton)

<u>Year</u>	<u>Merchant bars</u>	<u>Heavy sections</u>	<u>Heavy plates</u>	<u>Cold-rolled sheets</u>
1960	102	96	103	173
1961	100	94	97	125
1962	88	87	96	124
1963	81	78	87	111
1964	92	85	108	124
1965	90	82	92	108
1966	85	79	88	109
1967	81	82	88	106
1968	79	79	87	114
1969	105	113	140	152
1970	120	146	141	152
1971	107	114	130	130
1972	117	130	128	146
1973 (March)	171	183	175	214

Source: The Steel Market, Economic Commission for Europe, several issues.

The fluctuations in prices for individual products are rather strong; in most cases 1973 prices are nearly double of what they had been in the recession years 1965 to 1968.

Factors of production

30. During the period reviewed in this paper, i.e. the years since 1960, the supply of the principal iron and steelmaking materials did in general not pose any major problems which could have hampered the required growth of output. This does, of course, not exclude that during spurs in the rate of operation a number of short-term bottlenecks occurred, particularly in the availability of scrap; and it should also be noted that in more recent years the steel industry, mainly in western Europe, went through periods when coking coal and coke were in short supply and had shown a general tendency to increase in price.

31. The production and supply of iron ore were adequate at all points of time over the period reviewed. Although the somewhat increased use of pig-iron for steel-making (as a consequence of the growing operation of top-blown oxygen converters) required a more than proportionate increase in Fe-requirements, this was compensated by a general improvement in the quality of iron ore consumed, not only as lump ore but also in the form of agglomerated products, mainly sinter and, as a new type, iron ore pellets. This is also brought out by figures in the last part of table 8 and by the data in table 9 on production of agglomerates.



**Table 8**  
**Specific consumption of raw materials for pig-iron 1960, 1965, 1970**  
 (kilogrammes per ton of pig-iron produced and percentages)

Country	Specific coke consumption			Specific scrap consumption			Proportion of agglomerates in total ore charge (percentages)			Specific consumption of iron ore and agglomerates		
	1960	1965	1970	1960	1965	1970	1960	1965	1970	1960	1965	1970
	Belgium *	844	646	584	94	27	24	15.0	45.2	53.4	2255	1901
France	972	784	626	88	30	15	15.9	48.6	67.7	2821	2393	2104
Germany, Fed. Rep. of	834	672	559	36	25	16	41.0	67.4	70.1	1875	1645	1519
Italy	777	663	540	19	5	7	47.1	61.8	89.8	1652	1564	1477
Luxembourg	1092	860	730	53	22	68	22.9	36.7	40.4	3444	3112	2764
Netherlands	790	559	483	-	-	-	45.3	83.9	53.3	1617	1598	1608
Austria	730	617	510	25	32	18	52.6	54.5	56.4	2142	2041	1897
Spain	1121	939	755	-	18	11	36.1	33.7	57.0	2055	1936	1741
Sweden <sup>a/</sup>	576	574	585	49	34	9	97.6	97.4	91.1	1619	1567	1465
United Kingdom	825	680	625	93	34	68	49.6	71.4	71.2	1892	1708	1652
Yugoslavia	1127	904	763	70	63	80	41.0	45.0	61.4	2530	1955	1631
Bulgaria	..	..	..	..	..	..	..	..	..	..	..	..
Czechoslovakia	988	768	..	76	67	..	30.7	69.7	..	1686	1850	..
Hungary	..	834	677	..	42	70	..	56.3	92.6	..	2080	1951
Poland	1041	900	704	22	19	10	61.4 <sup>b/</sup>	60.6 <sup>b/</sup>	67.9 <sup>b/</sup>	2097	2148	2001
U.S.S.R.	724	586	574	..	..	26	73.0	87.0	92.6	1871	..	1803
United States	770	650	658	53	57	58	52.5	..	..	1794	1557	1603
Japan	619	507	478	23	7	1	..	62.6	75.9	..	1555	1361

Source: United Nations Economic Commission for Europe, Quarterly Bulletin of Steel Statistics for Europe

Notes:

a/ Specific coke consumption represents consumption of coke-oven coke in blast furnaces, electric furnaces and low-shaft furnaces.

b/ Including some quantities of concentrates.

The specific consumption of iron ore and agglomerates per ton of pig-iron produced fell to a considerable extent over the period 1960 to 1970, reaching in the most advanced countries values around 1500 kg. This decrease in specific use of iron ore, together with the - in some years - low rates of expansion or even stagnation of iron and steel production and the rapid expansion of mining capacity in Latin America, Africa and Australia resulted in a considerable fall in iron ore prices. This is shown by the movements in the price for Kiruna D ores, c.i.f. Rotterdam, from Sweden, which is, if not in its absolute level, at least representative for the trend in prices for ores entering into international trade (SKr. per ton):

<u>Year</u>	<u>Price per ton</u>
1960	59.50
1961	59.50
1962	56.00
1963	52.50
1964	52.50
1965	52.50
1966	52.50
1967	51.00
1968	45.00
1969	43.50
1970	43.50
1971	53.50
1972	53.50

For 1973, the fall in Australian export prices and the devaluation of the US-\$ have left their impact on the price level set for 1973 in the annual contracts concluded by Swedish exporters which dropped once more by about 12 per cent.

32. An important feature for the iron ore situation during the 1960s was the increase of imports into western Europe and also into the United States from overseas: Total imports of western Europe and the United States had grown from 120 million tons (actual tonnage) in 1960 to about 170 tons in 1970, or by 42 per cent, with domestic ore production decreasing from 232 million tons to 224 million tons during the same period (by 6 per cent), mainly in western Europe.

33. As will be seen from the first three columns of table 8 specific consumption of coke in blast-furnaces (which account for between 85 and 95 per cent of coke use in the iron and steel industry) has fallen considerably in all countries. Whereas in 1960 most countries used still between 800 and 1100 kg of coke per ton of pig-iron, the majority of values is now situated between 500 and 700 kg, and there are already countries having an average specific coke use of less than 500 kg <sup>1/</sup>. This fall in the use of coke was caused by the improvement in blast-furnace technology, consisting mainly of the use of high-top pressure, constant humidity, the addition of fuel oil, natural gas, oxygen and powdered coal; the advances achieved in burden preparation were mentioned already (table 9) and the improvements in size and age of furnaces operated have, of course, also made a major contribution.

---

<sup>1/</sup> Japan has reached in 1972 a specific coke consumption of 442 kg. The technical limit is at present believed to be at 330 kg.

**Table 2**  
**Production of agglomerates in selected countries**  
**1960, 1965, 1970**  
 (thousands of tons)

Country	1960	1965	1970
Belgium	2 231	7 214	9 944
Luxembourg	2 984	4 749	5 316
France	6 350	18 553	27 904
Germany, Federal Republic of	19 793	29 912	35 008
Italy	2 129	5 407	9 081
Netherlands	968	3 212	3 191
Total EEC (six)	34 399	69 047	90 444
Austria	2 573	2 488	3 222
Sweden	2 878	4 594	8 351
United Kingdom	15 024	21 691	20 858
Yugoslavia	1 008	1 060	1 382
Bulgaria	..	975	..
Czechoslovakia	4 011	7 678	11 396
Hungary	1 536	1 883	3 307
Poland	5 494	7 000	11 451
USSR	65 135	..	148 772
United States	40 681	80 693	85 284

**SOURCE:** Quarterly Bulletin of Steel Statistics for Europe,  
 Economic Commission for Europe, several issues.

34. These developments in specific coke use have had a noticeable effect on total coke consumption, as will also be seen from the following figures on apparent consumption (thousand tons).

<u>Country or region</u>	<u>1961</u>	<u>1965</u>	<u>1970</u>
ECSC	70 605	70 753	68 058
United Kingdom	17 038	16 756	19 625
Other western European countries	8 790	8 450	9 761
Eastern European countries (incl. the USSR, but excl. the German Democratic Republic)	72 273	85 238	90 063
United States	51 712	59 620	58 195

In certain countries, like those of the ECSC and in the United States, apparent coke consumption has been decreasing in absolute terms while pig-iron production continued to increase between 1960 and 1970 (in the ECSC by 26 million tons or 48 per cent, in the United States by 21 million tons or 36 per cent). In other countries of both western and eastern Europe, the strong growth of pig-iron output more than compensated for the fall in specific use of coke.

35. Prices for metallurgical coke had, during the 1960s changed very little in the main consuming countries. In 1969, however, when there was a relatively sudden increase in iron and steel production in western Europe and a high level of operation, a temporary shortage occurred, which was, first, a shortage of coking capacity rather than of coking coal and only later a shortage of coking coal: a number of obsolete cokeries had been taken out of production (among others, for reasons of air pollution) and the new installations had not as yet become operational. Although part of the increased requirements could be covered from stocks, additional quantities had to be imported, which created a certain shortage early in 1970 also in the United States. In most countries, coke prices are set in long-term contracts so that there was no immediate effect; but for spot sales prices doubled within a short time and prices in long-term contracts also increased. The following changes were reported from western European countries (percentage change over previous year)<sup>1/</sup>:

<sup>1/</sup> Source: The Steel Market in 1972, Economic Commission for Europe, Geneva, 1973.

Country	1962	1970	1971	1972
Germany, Federal Republic of	+ 15.4	+ 16.6	+ 15.5	..
Luxembourg	+ 22.5	+ 10.4	+ 29.4	-
Sweden	+ 7	+ 42	+ 15	- 3
United Kingdom	+ 11.0	+ 16.8	+ 22.9	+ 5.5

It will be seen that in 1972, when the increase in coke demand had been somewhat reduced, price increases were less, or even price falls were recorded.

36. Next to iron ore, scrap is the principal source of iron for steel production. World scrap consumption at the end of the 1960s is estimated to have been at over 330 million tons, compared to a pig-iron and blast-furnace ferro-alloy production of about 410 million tons. The United States used 86 million tons (26 per cent) of scrap, western Europe 82 million tons (25 per cent), and eastern Europe 75 million tons (about 23 per cent)<sup>1/</sup>. The over-all relationship in the use of pig-iron and scrap has changed very little since 1960. In the ECSC countries the specific consumption of scrap in 1960 had been at 402 kg/ton and in 1970 it was at about 400 kg/ton; in the United Kingdom it had somewhat increased from (520 kg/ton in 1960 to 525 kg/ton), and this was also true for most eastern European countries (e.g. Poland: 544 kg/ton in 1960, 550 kg/ton in 1970). Trends in the United States were similar (510 kg and 515 kg respectively in 1960 and 1970). Given this relative stability in specific consumption, total scrap requirements grew almost in step with crude steel production which is its main destination (scrap use in blast-furnaces being relatively small, as will also be seen from table 8, further above). This is also illustrated by figures on total scrap consumption in the iron and steel industry:

Region or country	1960	1965	1970	Compound rate of growth 1960 - 1970
Total western Europe	62 345	70 755	84 800	3.1
of which: ECSC	37 453	42 039	51 225	3.1
United Kingdom	18 399	20 186	21 055	1.4
Total eastern Europe	..	..	75 000	..
of which: Poland	4 221	5 556	6 488	4.4
USSR	..	..	..	..
United States	60 299	81 969	77 617	2.6

<sup>1/</sup> Source: Problems Relating to Iron and Steel Scrap, Economic Commission for Europe, Geneva, 1971.

37. About 45 to 50 per cent of the total scrap used in the iron and steel industry originates, on an average, in the steel industry itself, the remainder being so-called bought scrap. It is this latter type on which short-term fluctuations in demand for scrap are mainly borne out, since the industry's own, or circulating scrap, which is of known quality and arises of necessity in normal operation, is used in preference to bought scrap, particularly during times of reduced rates of operation. This situation results in considerable fluctuation in scrap prices, which follow rather closely the activity of the iron and steel industry. An important influence on the general scrap price level is exerted by the rate of activity of the United States' steel industry, but also by the prices obtaining in that country, which is the principal international supplier of scrap.

38. Prices for prime quality scrap (comparable to No.1 heavy melting scrap in the United States) have developed since 1960 as follows (US-\$/ton; January of each year).

<u>Year</u>	<u>United States</u>	<u>Germany, Federal Republic of</u>	<u>Italy</u>
1960	41.83	..	..
1961	31.50	37.00	43.26
1962	37.50	35.50	42.46
1963	27.83	28.62	34.09
1964	28.82	26.00	35.64
1965	38.17	29.00	38.85
1966	34.83	29.00	38.01
1967	27.83	26.75	35.54
1968	32.50	29.00	41.32
1969	26.83	29.00	36.36
1970	41.17	38.75	35.20
1971	41.17	31.69	38.40
1972	34.17	30.07	36.11
1973	49.00	..	

Source: Problems Relative to Iron and Steel Scrap, Economic Commission for Europe, Geneva, 1971.

It will be seen that the instability in steel demand and production which characterised the larger part of the 1960s led to a considerable fall in scrap prices, a trend which was only interrupted when the boom conditions in 1968/1969 and early in 1971 brought very strong demand for scrap.

29. As has been mentioned earlier above the United States is the main international supplier of scrap. This is also brought out by the following data:

Exports of scrap from selected countries, 1960, 1965 and 1969<sup>1/</sup>  
(thousand of tons and percentages)

Country	1960		1965		1969	
	1000 t	%	1000 t	%	1000 t	%
Western Europe, total	3441	31.2	3631	23.8	6232	34.6
of which:						
ECSC	3316	30.1	5014	39.0	5499	30.5
United States	5552	59.2	5653	44.0	8323	46.2
USSR	170	1.5	565	4.4	1325	7.4
Total world	11020	100.0	12852	100.0	18000	100.0

The overall situation has not changed significantly since 1969: In 1971, the ECSC countries exported 6.1 million tons, and the United States only 5.7 million tons, due to the reduced steelmaking activities in western Europe and Japan. It should be noted that the USSR has in recent years increased its importance as an exporter of scrap (in 1971: 2.7 million tons).

30. The main destination of scrap exports are a few countries which together take about two thirds of the total, as will be seen from the following figures:

Imports of scrap into selected countries, 1960, 1965, 1969 and 1970<sup>1/</sup>  
(thousands of tons and percentages)

Country	1960		1965		1969		1970	
	1000 t	%	1000 t	%	1000 t	%	1000 t	%
Italy	3220	27.7	4594	35.6	5133	28.5	5144	..
Japan	4426	39.4	3407	26.4	4879	27.1	5793	..
Spain	..	..	131	1.0	1237	6.9	1361	..
Germany, Federal Republic of	1025	8.9	1081	8.4	1211	6.7	1431	..
Total world	11020	100.0	12852	100.0	18000	100.0	..	..

<sup>1/</sup> Source: Problems relating to iron and steel scrap, I.C.



It should be noted that in more recent years scrap imports into Italy and Spain have grown further (in 1972, Italy imported 5.7 million tons), whereas Japan has imported less scrap than previously (in 1972: 2.5 million tons).

Investment expenditure and growth of capacity

As has been mentioned in the section of this paper dealing with fluctuations in demand and supply of steel, the investment behaviour of steelmakers was one factor which has during the 1960s contributed in a certain measure to the instability in the relationship between supply possibilities and actual demand for steel products. Uninterrupted series on investment expenditure are only available for a limited number of countries; the selection given below illustrates, however, rather clearly the changes which have occurred since 1960.

Investment expenditure in the iron and steel industry,  
1960 to 1971

Year	<u>ECSC total (b)</u>		<u>United Kingdom</u>		<u>United States</u>	
	million US-\$	percentage change over previous year	million US-\$	percentage change over previous year	million US-\$	percentage change over previous year
1960	775	..	409	..	1521	..
1961	1123	+ 57.8	556	+ 36.4	959	- 36.9
1962	1230	+ 9.5	476	- 14.7	904	- 5.3
1963	1480	+ 20.3	15	- 54.8	1049	+ 15.0
1964	1315	- 11.1	254	- 28.4	1600	+ 59.8
1965	932	- 19.1	139	- 9.7	1818	+ 13.6
1966	848	- 9.0	117	- 15.8	1953	+ 7.4
1967	750	- 11.6	136	+ 16.2	2173	+ 11.3
1968	302	+ 6.9	119	- 12.5	2372	+ 9.2
1969	1005	+ 25.3	102	- 14.3	2136	- 9.1
1970	1614	+ 60.6	191	+ 87.3	1800	- 15.7
1971	2466	+ 52.8	414	+ 116.8	1406	- 21.9

Source: The Steel Market, Economic Commission for Europe, Geneva, several issues.

1/ Source: Problems relating to iron and steel areas, l.c.

It will be seen that in the ECSC countries (5) investment expenditure continued to increase in the period 1960 to 1963, when demand was slackening and competition in the world steel market was very strong due to tonnages originating from new installation being offered at relatively low prices: in fact export prices had reached their lowest level in 1963, the year when investment expenditure was at a record level. This period was followed by falling investments, last not least because the profit situation in the western European steel industry was deplorable. The renewed turn from a buyers' to a sellers' market in 1968 was promptly followed by an investment boom: it should, however, be noted that the high 1972 figure for the ECSC resulted partly from the starting of a number of major projects, like the FOS plant in France. The figures given for the United Kingdom show a similar trend; increases after 1969 are not only due to the more favourable demand situation, but reflect also the new investment policy of the then established British Steel Corporation.

42. The investment expenditure in the United States followed rather different lines: The hesitant steel demand in the early 1960s was accompanied by a fall in investment, and the increasing general economic activity from 1962 onwards initiated a period of high investment, for modernisation rather than for expansion of capacity.

Table 10  
Annual investment expenditures in selected countries, 1960, 1965 and 1970  
(millions US dollars)<sup>a</sup>

Country	Total investment			of which											
				Charge preparation		Pig iron (incl. cathodes)		Crude steel		Rolling mills					
	1960	1965	1970	1960	1965	1970	1960	1965	1970	1960	1965	1970			
Belgium	136.9	142.4	232.8	-	-	28.7	30.1	18.3	19.6	11.4	28.8	39.6	77.7	71.5	134.0
France	232.1	169.6	567.8	32.3	18.1	35.5	57.0	32.5	34.8	25.5	16.4	73.2	85.8	80.1	161.1
Germany, Fed. Rep. of	209.9	311.6	373.2	8.6	5.8	32.1	62.8	47.9	106.2	44.3	39.5	56.2	119.0	158.4	313.8
Italy	63.2	246.3	267.5	1.4	0.7	7.9	6.2	50.8	31.6	5.1	26.3	41.0	31.0	88.5	154.0
Luxembourg	28.4	24.8	49.0	0.9	1.0	20.1	7.5	4.9	8.0	2.7	10.9	5.4	16.0	7.3	12.2
Netherlands	44.7	37.3	115.5	-	-	9.8	8.7	6.0	8.8	6.5	2.9	6.3	20.8	19.5	61.4
Total EEC	775.2	932.3	1,614.8	43.2	25.6	134.1	172.3	160.4	209.0	95.5	124.8	221.7	350.3	425.5	836.5
Austria	69.0	28.9	60.0	1.9	2.0	6.4	3.0	2.1	9.5	2.1	2.4	14.6	37.4	9.4	15.7
Spain	39.0	116.3	..	7.6	6.6	..	1.2	18.2	..	5.8	15.7	..	26.2	62.3	..
Sweden	82.6	93.0	121.4	..	..	..	..	..	..	..	..	..	..	..	..
Switzerland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom <sup>b</sup>	488.8	138.8	191.0 <sup>c</sup>	24.5	13.9	32.0	81.8	9.4	11.0	52.1	23.9	54.0	234.1	59.0	62.0
Yugoslavia	..	133.3	..	..	..	..	..	..	..	..	..	..	..	..	..
Finland	..	..	47.6	..	..	1.0	..	..	2.1	..	..	7.2	..	..	33.8
United States	..	1,818.0	1,800.0	..	..	..	..	..	..	..	..	..	..	..	..
Czechoslovakia	..	2,708.0	2,308.0	..	..	..	..	..	270.0	..	..	230.0	..	..	620.0
German Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hungary	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Poland	4,108.0	5,070.0	5,632.0	..	307.0	198.0	..	..	60.0	..	820.0	945.0	..	1,670.0	2,154.0
Romania	..	..	3,909.0	..	..	21.0	..	..	197.8	..	..	92.8	..	..	..
Soviet Union	1,195.0	1,500.0	1,915.0	..	..	..	..	..	..	..	..	..	..	..	2,146.0

Notes: The differences between total investment and the items shown are due to the omission of the item "miscellaneous", containing mainly general services and auxiliary plants.

<sup>a</sup> Original prices converted at official current exchange rates; in the case of socialist countries national currencies.

<sup>b</sup> Excluding schemes costing less than £100,000.-

<sup>c</sup> Total invest. expenditure (disregarding the EEC product definition) amounted to 269 million US dollars by EEC and to 365 million US dollars for United Kingdom iron and steel industry as a whole.

<sup>d</sup> Included under pig-iron.

43. Table 10 provides a survey of the sector pattern of investments in selected countries over the period reviewed. The major portion of expenditure is traditionally on rolling and finishing equipment, which is also the more expensive part. The figures reflect, however, very well the increasing efforts made for charge preparation whose share in the total was increasing very rapidly; faster than average growth is noted for rolling and finishing and also for crude-steelmaking equipment, with the effect for blast-furnaces becoming somewhat smaller. In the ECSC, the proportions of expenditure for individual sectors were in 1960 and 1970 as follows:

<u>Year</u>	<u>Charge preparation</u>	<u>Pig-iron</u>	<u>Crude steel</u>	<u>Rolling mills</u>
1960	5.6	22.2	12.3	45.2
1970	8.3	12.9	13.7	51.8

When comparing investment figures over these ten years it should be borne in mind that prices for iron and steel-making equipment as well as construction costs had risen considerably during the 1960s.

44. Since the measurement of capacity for iron and steel production is in itself a difficult task, and since available physical capacity cannot always be used economically, it is also somewhat difficult to assess its growth and the rate of its use. Moreover, for many countries, reliable figures are only available for crude steel capacity, and not for pig-iron or finished steel capacity. It can, however, be assumed that in a world where most of the steel is produced in fully integrated iron and steel plants, crude steel capacity is about in balance with the ancillary and the successive stages and thus presents a reliable central measure for the over-all expansion of capacity.

Growth of crude steel capacity in Europe and in the United States,  
1960 to 1972

(thousands of tons and indices)

<u>Region or country</u>	<u>1960</u>		<u>1965</u>		<u>1970</u>		<u>1972</u>	
	<u>1000 t</u>	<u>Index</u>	<u>1000 t</u>	<u>Index</u>	<u>1000 t</u>	<u>Index</u>	<u>1000 t</u>	<u>Index</u>
<u>World, total</u>	419 000	100	527 000	126	620 000	148	704 000	168
<u>Western Europe, total</u>	115 600	100	149 500	129	174 000	151	201 500	174
<u>ECSC, total</u>	76 500	100	102 100	133	126 635	166	142 355	186
<u>Eastern Europe, total</u>	96 000	100	133 500	139	156 700	163	170 000	177
<u>United States</u>	134 800	100	142 000	105	150 000	111	160 000	119
<u>Japan</u>	27 300	100	47 400	174	90 000	340	116 700	427

Source: World Trade in Steel and Steel Demand in Developing Countries, ECE, Geneva, 1969; The Steel Market, ECE, Geneva, various issues; and Secretariat estimates.

The (partly estimated) figures given above show the slow-down in expansion which occurred between 1965 and 1968/69 in western Europe, and the ensuing phase of rapid expansion of capacity which is still continuing. For eastern Europe, the apparent slow-down in capacity expansion is in line with the planned reduction in quantitative growth in favour of quality improvements. The United States figures reflect the very slow expansion of capacity, due to the taking out of operation or even out of capacity reserve of economically obsolete installations. Figures illustrating the spectacular growth of the Japanese steel industry have been added.

International co-operation and the transfer of technical know-how

45. Since the ECE region consists mainly of industrialised countries the channels for the transfer of technical know-how are well developed and have - with the exception of east-west relations - posed no major problems over the period reviewed in the present paper. The ordinary form of transfer of iron and steelmaking technology takes, like for other industries, the form of sales of patents, licences, of equipment and even whole plants, together with sub-contracting, co-production, joint-venture arrangements and joint research and development work. In more recent years, a new type has developed, particularly for the exchange of know-how between eastern and western Europe - through the conclusion of industrial co-operation agreements<sup>1/</sup>.

<sup>1/</sup> A full report on this subject was presented to the twenty-eighth session of the Economic Commission for Europe, entitled: Analytical Report on Industrial Co-operation Among ECE countries, Geneva, 14 March 1973, document E/ECE/844 and Addenda.

46. In the practice of co-operation between the steel industries of the ECE region such industrial co-operation contracts are known to play an important role; given, however, their commercial character it is difficult to provide concrete examples. The contracts commonly involve the transfer of technical, organisational and marketing know-how, or of production equipment, in exchange for goods and services produced by the process which is the object of the agreement, or for other goods and services. Such arrangements may also comprise co-operation in the production of different types of products (e.g. hire-rolling) as well as joint ventures involving common investments and profit-sharing. An example would be the project of an agreement between a company in the Federal Republic of Germany and the appropriate authorities in the USSR to erect on the Kursk magnetic anomaly a direct reduction plant of possibly 5 million tons capacity. The company in the Federal Republic of Germany would provide the equipment and know-how for the plant, help to erect and to initially operate it. Equipment, know-how and services would be paid for by part of the pre-reduced pellets produced in the new plant and, possibly, by semi-finished steel products produced in the same plant.

#### Present situation and outlook

47. After the slow-down in general economic growth which had started in mid-1970 and continued through most of 1971 in western Europe, economic activity started to gather momentum at the end of 1971. Steel demand was at first hesitatingly following this general trend, but reached rather high levels during the second half of 1972. In the United States, where economic recovery had already started during the second half of 1971, developments in 1972 were very favourable, with Gross National Product rising by 6.5 per cent, a record rate for the country. The economic expansion of the countries in eastern Europe (including the USSR) taken together and measured in terms of national income, remained somewhat below the results achieved in 1971. This was mainly ascribed to difficulties encountered in the agricultural sector; industrial output and, hence, steel consumption continued to expand.

48. For the world as a whole, these trends in general economic activity resulted in further growth of steel use and production, which attained about 630 million tons of crude steel, 3 per cent more than in 1971 and 5 per cent above 1970. The rates of increase were for the different regions and countries as follows: + 9.1 per cent for western Europe; + 4.9 per cent for eastern Europe (including the USSR); + 10.4 per cent in North America; + 9.4 per cent in Japan; and + 9.5 per cent in China. The developing countries taken as a group produced 26 million tons of crude steel, or

---

1/ Based on "The Steel Market in 1972", Economic Commission for Europe, Geneva, 1973.

12.5 per cent alone in 1973.

49. When considering these figures it should, however, be borne in mind that the preceding year had been in many countries - particularly in western Europe and Japan - one of falling and stagnating steel demand so that rates of increase over 1970 would be less striking. It should also be noted that trends were not uniform over the year and between countries, and that they resulted from rather different types of underlying general developments: whereas rising steel demand in the United States could seem to have been based on a genuine increase in industrial and construction activity and, hence, of actual consumption of steel, the resumed rate of growth in western Europe and in Japan occurred only during the second half of 1972, and was in its early phases based on a domestic re-stocking movement and an increase in foreign demand. For the year as a whole, rates of capacity use remained relatively low or even fell: new capacity was constructed after the preceding boom period and the increase of output was not sufficient to put all of it into operation.

50. Although statistical data for 1972 are not yet complete, it would seem from the information so far available that the volume of world trade in steel has remained at about the level of 93 million tons attained in 1971. This is ascribed to the relatively slow recovery of demand in several of the principal importing countries which had, furthermore, spare capacity available to meet demand at short notice; another reason is certainly the strict application of the terms set in the different voluntary export limitation agreements. Prices in international trade had remained relatively stable during most of 1972. In autumn 1972, prices for most products were raised and reached at the year-end a level considerably above that a year before (increases of between 5 and 14 per cent, according to product). Prices for cold-reduced sheets had started this upward trend already in March/April 1972 and rose in December by as much as 30 per cent above their January 1972 level.

51. While at the end of 1971 and early in 1973 international trade in steel was hampered by the international monetary difficulties, 1972 was a period during which few adverse effects of this type were felt. The revaluation, however, of a number of currencies as well as the devaluation of the US-\$, are likely to have a lasting effect on the competitive situation in international steel trade which may lead to certain changes in its geographical pattern. A comparison of the situation in 1968 with that of early 1973 shows that the

price level generally in Europe and Japan. In addition, the possibility for exporters in the United States to reach the western European market has improved.

52. The resumed growth of iron and steel production did not result in any major difficulties for the steel industry during 1972. Prices for iron ore remained unchanged or showed a certain tendency to fall, and coking coal and coke prices were, for the first time in four years, not increasing. Scrap prices were an exception, in as much as they started to rise during the last quarter 1972 under the pressure of growing requirements for increasing steel production. Early in 1973 even a certain shortage developed, and certain qualities of scrap in the United States reached, for a short time, a price level exceeding the peak prices of 1967.

53. The outlook for general economic development in 1973 is rather positive for all countries. In western Europe it is expected that GNP will grow at between 5 and 6 per cent, and industrial output at a similar rate. The inflow of orders for steel has been very high in the first two months of 1973; it is, however, likely that during the coming months effective demand for steel will return to a more normal rhythm but will remain at a high level. Quite apart from the impulses expected to come from the domestic markets, export demand is also likely to play an important part. A braking effect on this general upward trend could be expected by the persisting instability in exchange rates and by governmental measures to dampen the strength of demand in order to limit inflationary tendencies. In these circumstances and taking all factors into account, crude steel production in western Europe is likely to expand in 1973 to 175/176 million tons, which would be by 6 to 7 per cent above the 1972 output.

54. For eastern European countries and the USSR, plans for 1973 foresee that net material product should grow at 6.2 per cent in 1973, and gross output of industry by 6.5 per cent<sup>1/2</sup>. The rates of increase per individual countries are planned in most cases to remain somewhat below those achieved in 1972; exceptions are Bulgaria, the German Democratic Republic and the USSR for net material product, and Bulgaria, the German Democratic Republic, Hungary, and Romania for gross output of industry. Steel production for the region as a whole is, according to available target data, likely to be around 177 million tons, at the rate of about 4 per cent over 1972.

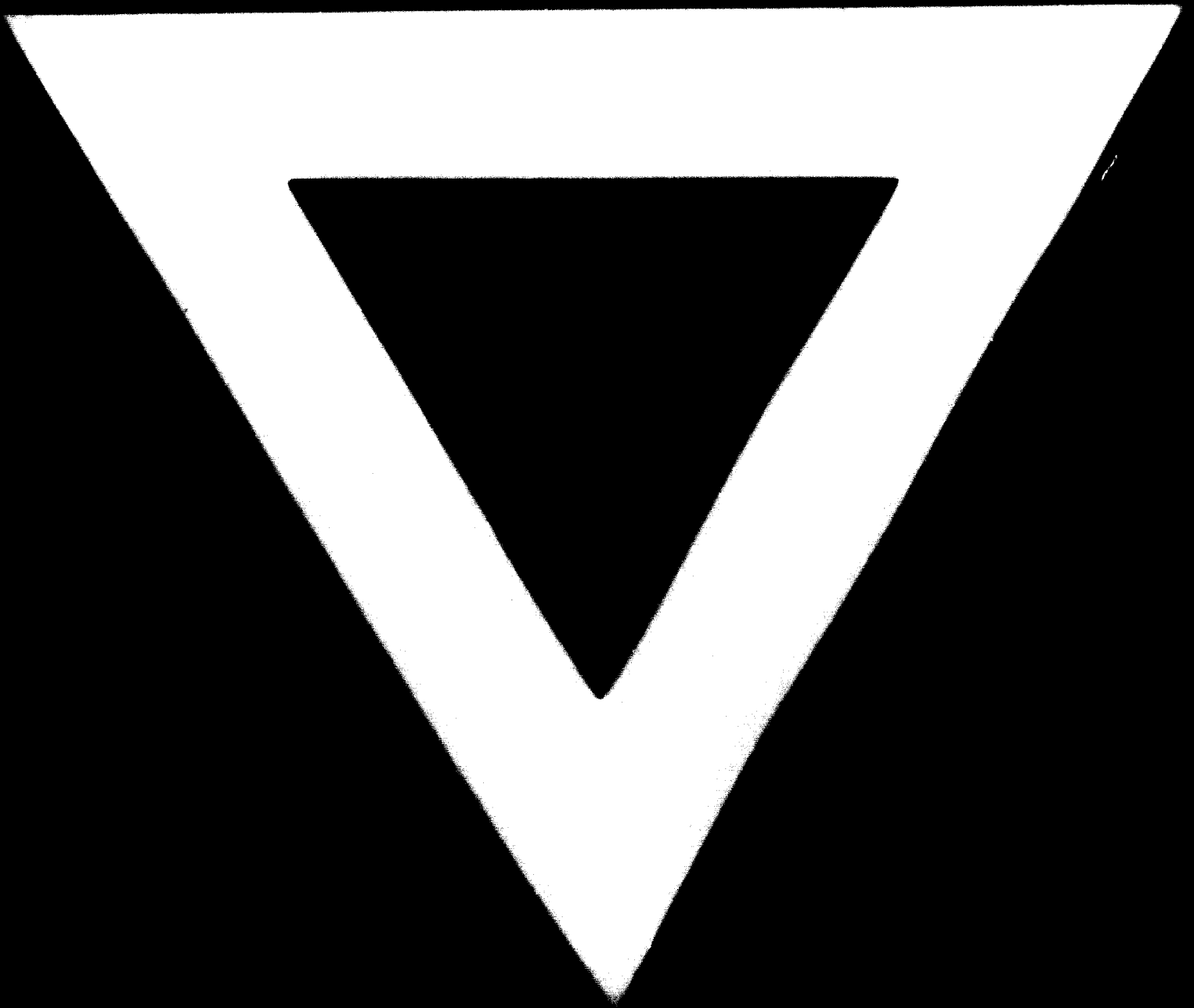


55. In the United States the upward trend in the economy is also expected to continue; a real growth rate of between 5 and 6.5 per cent is likely to be achieved, due to high activity in all industrial sectors and construction. The change in the competitive position of foreign-produced steel on the United States market has already increased the rate of ordering for domestic products, and this will in all likelihood continue. Thus, crude steel production may well reach 13 million tons or even exceed this quantity (plus 11.8 per cent over 1972).

56. General economic development in Japan is also continuing during 1973 at a rapid pace: GNP is forecast to rise by 10.7 per cent, industrial production by 12 per cent, and machinery manufacture and other fabricated metal products at about 16 per cent<sup>1/2</sup>. Given these high rates of growth for aggregates or sectors which in a large measure determine steel demand, it can be expected that crude steel production will also grow at a considerable rate; it is likely to reach a volume of 120 million tons (+ 13.5 per cent over 1972).

57. If the trends described above and the estimated results for the main areas and countries were to materialize over the year, a world crude steel production of close on 680 million tons (+ 8.4 per cent over 1972) could be attained. It is believed that although present capacity in most countries will have to be used at a high rate in order to produce the tonnage mentioned above, no major steel shortage situation is likely to arise; expansion of capacity could, therefore, be undertaken at a normal rhythm. Steel prices and cost of production are likely to increase further in the course of the year, although it would seem that the upward pressure for both would be less during the second half of 1973 than it had been in the early part of the year, or in the upswing phase of the previous steel demand boom (1968/1969). International trade in steel is likely not to expand considerably over its 1972 volume: certain tendencies towards a decrease (changes in competitiveness through monetary re-alignment; self-limitation agreements on exports to certain areas) will be compensated by others which are clearly for an increase (trade between Japan and China; strong demand from the developing countries; expansion of east-west trade as a consequence of détente in Europe).

<sup>1/2</sup> Japan Iron and Steel Monthly, Tokyo, January 1973, p.7.



9 . 8 . 74