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METAL DEMAND TRENDS IN SOUTHERN EUROPEAN COUNTRIES: A COMPARATIVE ANALYSIS

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ABSTRACT

This study evaluates metal demand trends and the fundamental forces underlying the unforeseen discontinuity in demand growth around the mid-1970s in selected semi-industrialized southern European countries.

Conventional demand functions and the intensity-of-use technique are used to identify the significance of the various potential determinants of metal consumption and two main factors behind the downward trend in intensity of use--the product composition of income and material composition of product.

The results indicate that income and intensity of use jointly determine the relatively lagging demand growth from 1974 to 1986. The decomposition analysis shows that intensity of use has a relatively higher influence than GDP on the metal demand trends of these countries.

In explaining the factors behind intensity-of-use decline, both intersectoral and intrasectoral shifts were found to have an important influence through changing the product composition of income and the material composition of product.

The sectoral application of the intensity-of-use technique indicates the importance of the manufacturing

sector in GDP and of the fabricated metals, machinery, and equipment division within the manufacturing sector. These two factors and the intensity of use of the fabricated metal products, machinery, and equipment division largely determine the intensity of use of GDP.

There are some important differences among the southern European countries despite their similarities in industrialization and economic development. Differences in the composition of GDP and the manufacturing sector generate cross-country variances in intensity of use of GDP.

The increasing share of manufacturing in GDP, and the increasing share of the fabricated metal products, machinery, and equipment division in the manufacturing sector has acted to increase intensity of use of GDP in the southern European countries, except for Spain. These increases have compensated for the possible downward intensity-of-use effects associated with technological changes and material substitution.

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Chapter 1

INTRODUCTION

1.1 Overview

The rapid growth in consumption of major metals following World War II tapered off dramatically in the early 1970s and for the most part has failed to recover (Figure 1.1). What at first was assumed to be a temporary event caused by fluctuations in the business cycle, later turned out to be a far more fundamental and structural turning point than most analysts had anticipated. Part of the slowdown has been attributed to continued slower economic activity. Western world gross domestic product (GDP), which rose at an annual average rate of 6.2 percent between 1950 and 1974, has since increased by only 1.7 percent a year (Tilton 1986). The other important consideration is the declining trend in intensity of use, the number of tons of a metal consumed per billion dollars of real GDP.

One school of thought suggests that there are two factors behind the downward trend in intensity of use--the product composition of income and the material composition of product. The product composition of income reflects the mix of goods and services provided by the economy. According to this theory, such a shift has taken place in

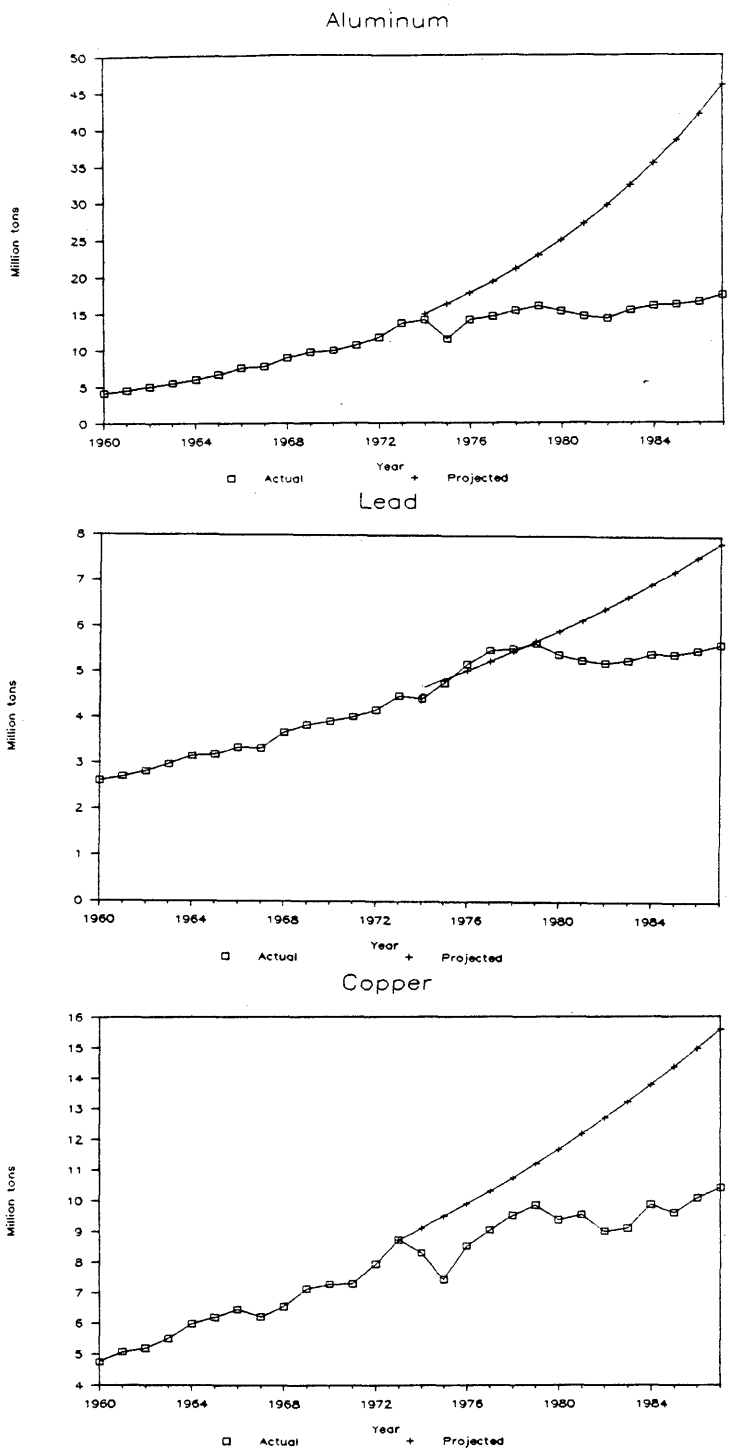

Figure 1.1 World Consumption of Selected Metals Actual and Projected Trends, 1960-1987

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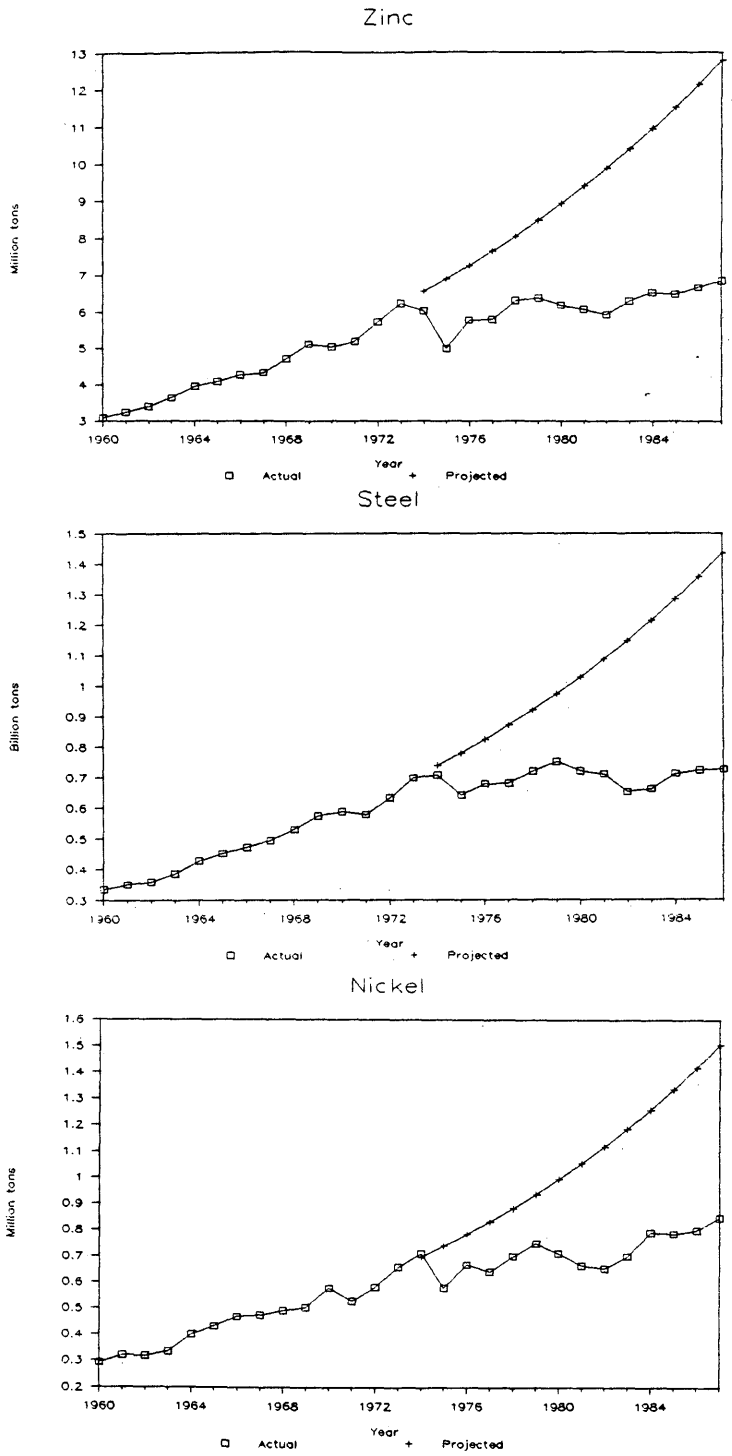

Figure 1.1 (continued)

developed countries as rising per capita income has greater consumer preference for low metal-intensive economic activities such as services and high value-added goods. The second factor, the material composition of product, reflects the amount of the steel, aluminum, copper, and other materials used in the production of specific goods. Over time, material substitution, technological change, and other factors can increase or decrease the amount of metal used in specific products. For example, the quantity of steel used in the automobile industry declined because of downsizing and the substitution of high-strength, low-alloy steel and other materials for traditional steel sheet (Eggert 1987).

1.2 Scope and Purpose

Other studies on world metal demand trends by Tilton (1987), Radetzki (1987), and Dobozi (1987) cover the Organization for Economic Co-operation and Development (OECD) countries, developing countries, and the centrally planned economies (CPEs). The purpose of this study is to complement these efforts by focusing on an intermediate group of countries, the southern European countries (SECs), which appear to exhibit a set of special characteristics in metal consumption.

The semi-industrialized countries of southern Europe--Greece, Portugal, Spain, Yugoslavia, and Turkey--have been chosen because they are relatively homogeneous in terms of industrialization and they are considered as latecomers to industrialization relative to the OECD countries and the CPEs. The level of economic development in these southern European countries is generally lower than in OECD countries and CPEs. The SECs also share similar export-oriented policies with a strong emphasis on heavy industries, implying high demand for base metals. The United Nations and some other international institutions recognize these countries as a distinctive group with many similar characteristics.

Yet, despite the similarities, important differences exist. For that reason, they will be separated into two groups: SEC-5, comprising Greece, Portugal, Spain, Yugoslavia, and Turkey, and SEC-4 which excludes Spain. This separation is justified by the disproportionately large weight and significantly different consumption behavior of Spain in the five-country aggregate, which may potentially bias the conclusions for the others. The major metals--steel, aluminum, copper, lead, nickel, and zinc--will be examined for the period 1960-1986. This period was chosen because of availability of data. The data

represent only the quantity demanded for consumption. A country's consumption is defined as domestic production of the unwrought metal, plus imports, minus both exports and net additions to domestic inventories as reported by Metal Statistics (Metallgesellschaft, annual) and International Iron and Steel Institute, Statistical Yearbook (various issues). Consumption is measured in tons of unwrought metal at the first stage of processing.

The study attempts to evaluate past trends in metal demand and the fundamental forces underlying the unforeseen discontinuity in demand growth in the SECs around the mid-1970s.

This study is organized as follows. Chapter 1 presents SEC consumption trends. The methods employed in this study are outlined in chapter 2. For analyzing determinants of metal demand trends, chapter 3 reports the findings obtained by econometric methods. Chapter 4 relies on the intensity-of-use technique, which first separates the influence of intensity of use on demand from that of GDP, to decompose consumption decline into various components. Chapter 5 then concentrates on identifying the factors determining intensity of use, such as material composition of product and product composition of income. Conclusions are presented in chapter 6.

1.3 Patterns of Metal Consumption

The consumption of aluminum, lead, copper, zinc, steel, and nickel over the 1960-1986 period is shown in Figure 1.2 for Greece, Portugal, Spain, Turkey, and Yugoslavia. Spain is the largest consumer. Yugoslavia, the second largest consumer, exhibits consumption trends similar to those of Greece, Turkey, and Portugal. The relative shares of metal consumption in Greece, Turkey, and Portugal have been increasing, while Spain's share has been decreasing. Spain, a relatively more developed and marketized country than the other SECs, reached its turning point in consumption of zinc and copper in 1974 and of aluminum and lead in 1976. The other SECs experienced no such turning point. In steel consumption, all SECs follow a similar pattern. Growth stopped around 1974, and after a slight decrease, consumption volumes fluctuated in a small range. In the case of nickel, Spain has followed a fast-growth consumption path, but the rest have experienced only small growth over time.

Table 1.1 shows the average annual rate of growth of metal consumption in the SECs. Although metal consumption of the SECs, except Spain, increased over time, this growth rate was smaller after 1974 than the historical rate.

The SECs, except Yugoslavia, show a similar pattern in

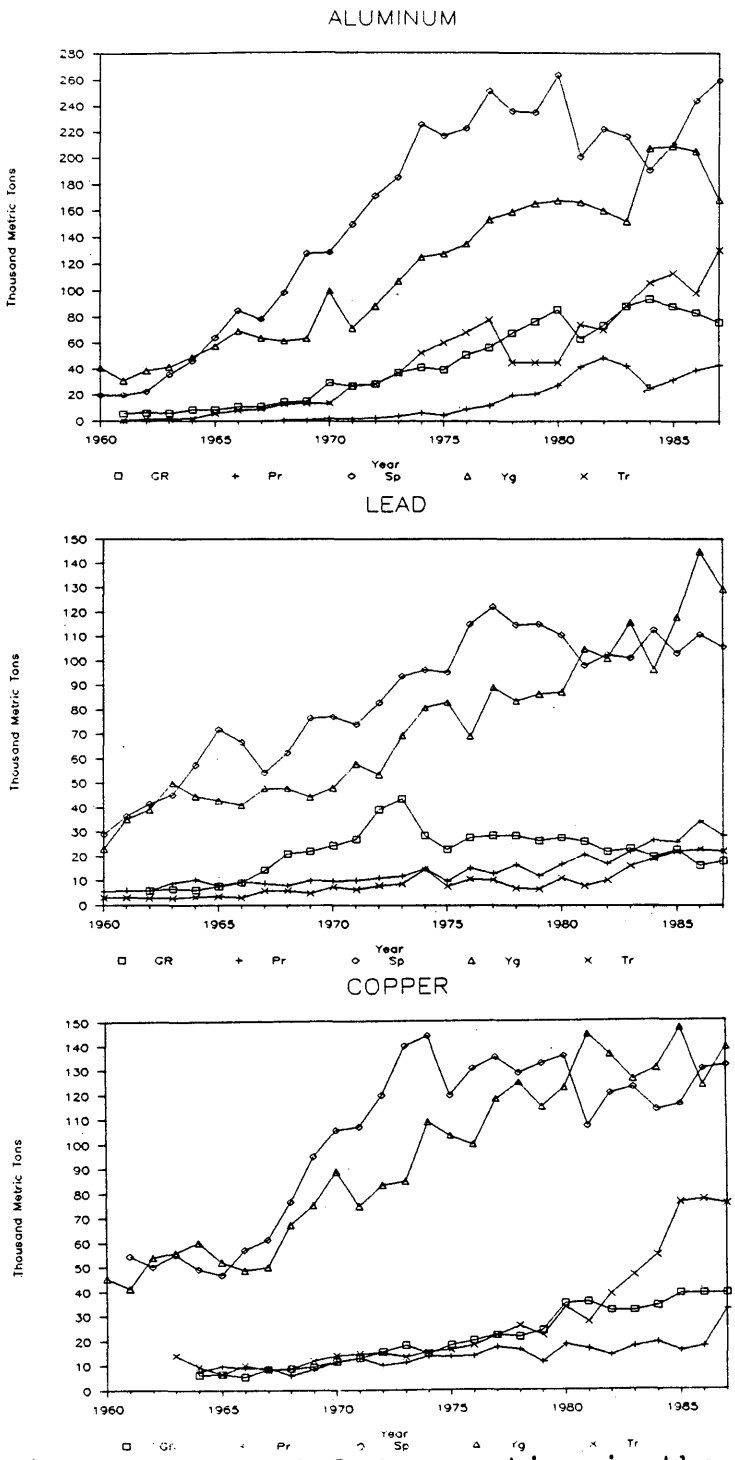

Figure 1.2 Metal Consumption in the SECs

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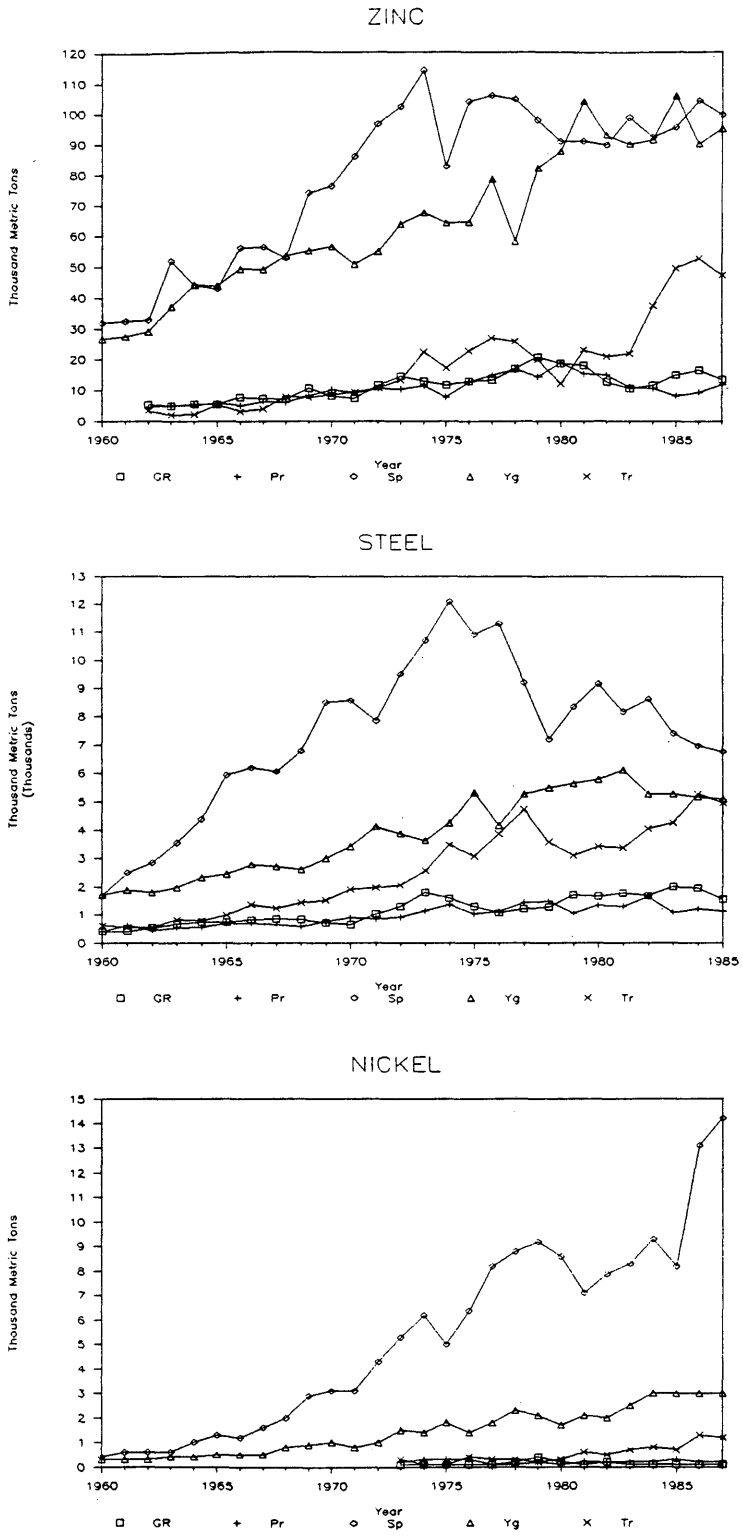

Figure 1.2 (continued)

Table 1.1 Average Annual Rate of Growth of Metal Consumption in Greece, Portugal, Spain, Yugoslavia, and Turkey (in percentages)

Country and Metal	1960-1973	1974-1986	1960-1986
Greece			
Aluminum	16.83	6.64	12.43
Lead	20.00	-3.18	4.69
Copper	12.89	7.74	9.12
Zinc	8.29	0.58	4.85
Steel	8.74	4.47	5.65
Portugal			
Aluminum	34.93	17.11	24.24
Lead	4.78	7.81	5.54
Copper	3.90	4.12	3.99
Zinc	8.48	-1.46	4.23
Steel	6.23	-0.24	4.31
Spain			
Aluminum	18.72	-0.01	9.17
Lead	7.46	1.03	4.35
Copper	9.15	-1.07	4.14
Zinc	9.13	-0.50	4.31
Steel	12.67	-3.55	4.06
Yugoslavia			
Aluminum	8.21	3.92	7.18
Lead	4.98	4.35	5.36
Copper	5.24	2.30	4.84
Zinc	6.31	3.91	4.68
Steel	6.71	1.21	4.85
Turkey			
Aluminum	34.31	2.01	18.66
Lead	9.44	6.85	7.42
Copper	4.67	13.79	9.12
Zinc	16.15	6.31	11.75
Steel	12.30	3.60	8.87

Source: Metallgesellschaft (various issues), International Iron and Steel Institute, Statistical Yearbook (various issues)

the intensity of use over the 1960-1986 period. While Spain has a relatively low intensity of use in the group, Yugoslavia shows significantly higher figures. Yugoslavia, which combines features of central planning and market mechanisms, tends to consume more metals per unit of output, possibly because of systemic reasons such as lack of pressure to minimize cost and soft budget constraints faced by self-managed firms (Dobozi, 1987). Turkey, the least developed country of the group, generally has the lowest intensity-of-use values, as expected. Figure 1.3 shows the metal intensity-of-use in the SECs for aluminum, lead, copper, zinc, steel, and nickel.

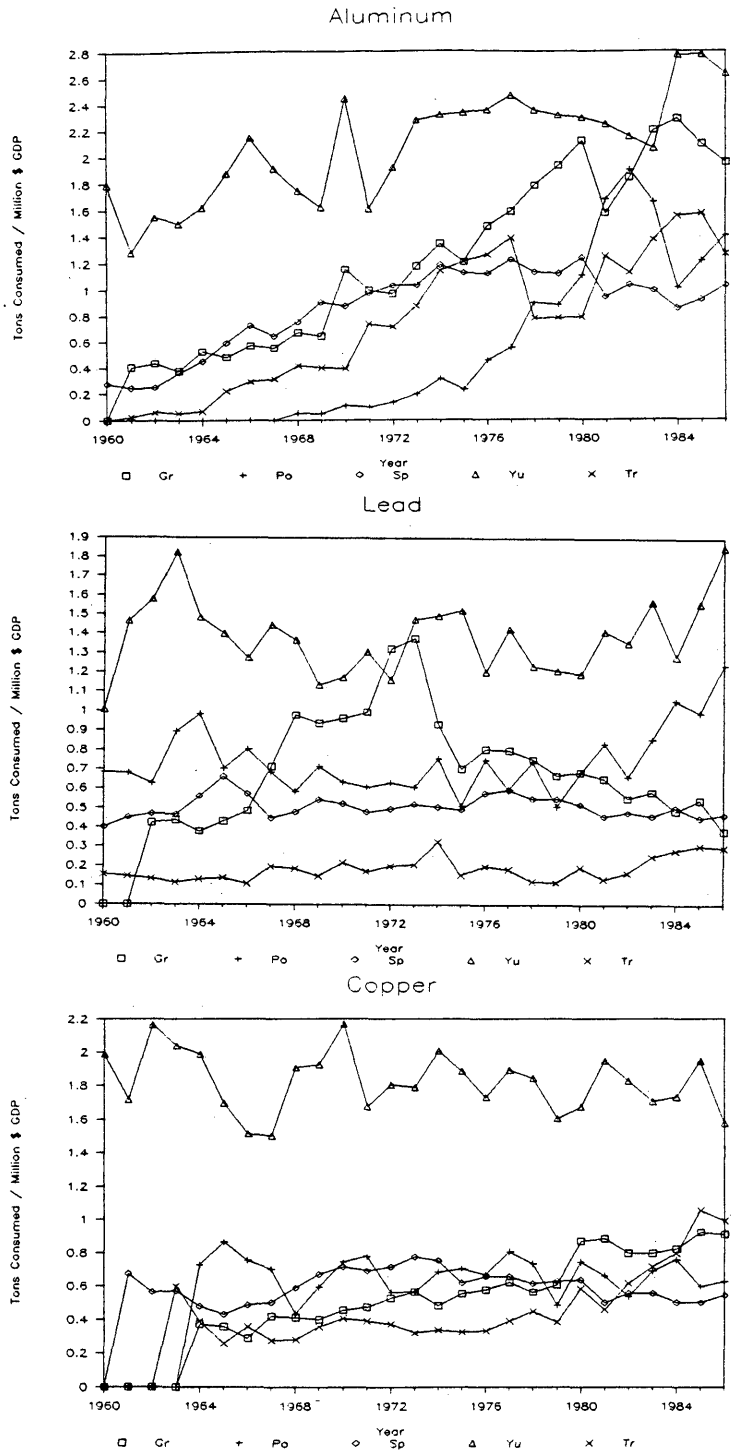

Figure 1.3 Metal Intensity-of-Use in the SECs

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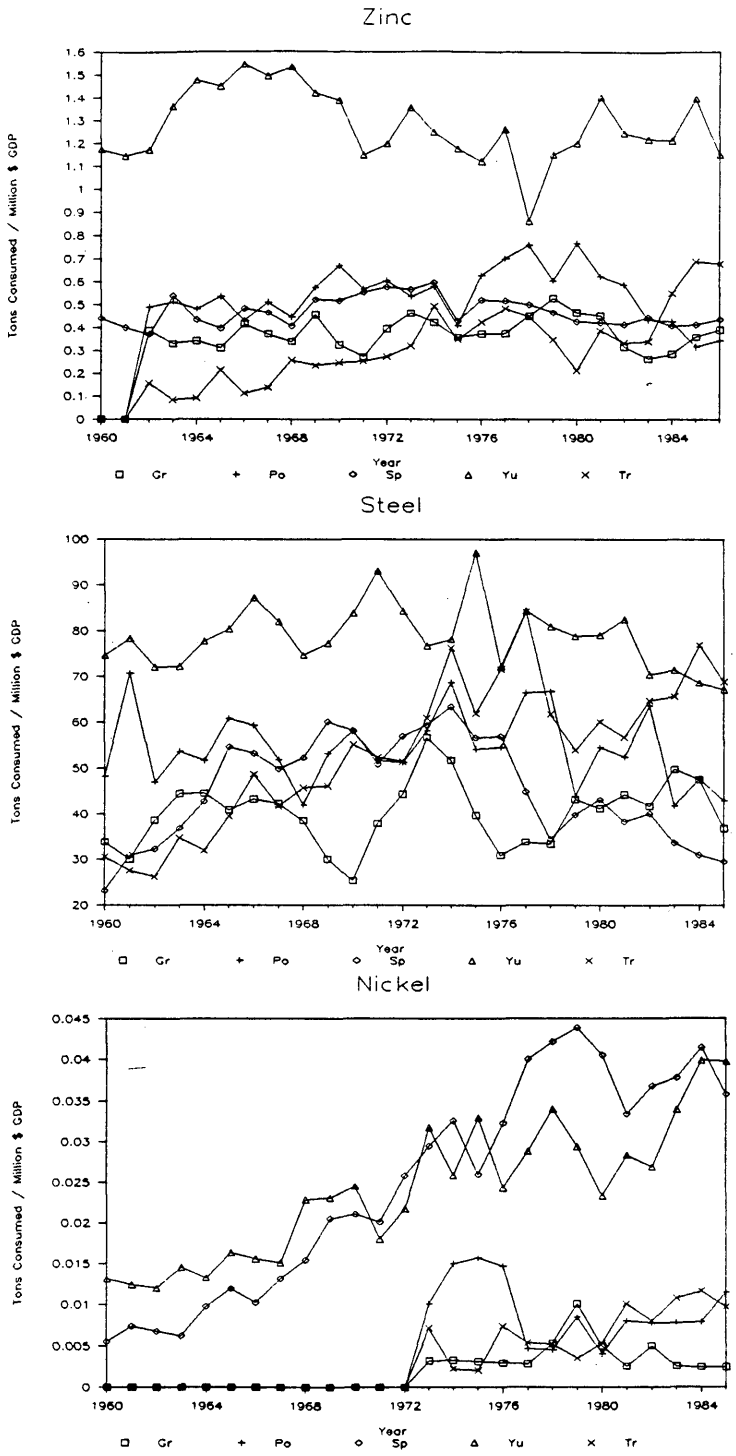


Figure 1.3 (continued)

Chapter 2

METHODOLOGY

2.1 Econometric Approach

Conventional demand functions are set up in chapter 3, to identify the significance of the various potential determinants of metal consumption such as the level of economic activity, the price of metal, and the price of close substitutes.

2.2 Intensity-of-Use Technique

The intensity-of-use technique is defined as the amount of metal consumed per unit of each final good produced by the economy. As explained in Radetzki and Tilton (1987), this relationship can be expressed as

$$D_t = \sum_{i=1}^{n_t} a_{it}\, p_{it}, \qquad (2.1)$$

where

D_t is the consumption of the metal;

p_{it} is the output in physical units of the final good;

a_{it} is the amount of metal consumed in the ith good;

and

n_t is the number of final goods produced in the economy, all in year t.

Defining the ratio of the output of the ith good (p_{it}) to national income (GDP_t) in year t as

$$b_{it} = p_{it} / GDP_t \tag{2.2}$$

and substituting for p_{it} in equation 1, gives

$$D_t = GDP_t \sum_{i=1}^{n_t} a_{it}\, b_{it}. \tag{2.3}$$

This indicates that national income (GDP_t), material composition of product (a_{it}), and the product composition of income (b_{it}) determine metal demand trends. The material composition of products reflects changes in the mix of materials used to produce specific goods; the product composition of income reflects shifts in the mix of goods being produced by the economy.

Intensity of use (IU_t) is defined as the ratio of metal consumption (D_t) to national income ($_{GDPt}$). Equation 4 shows that intensity of use is a function of the product composition of income and the material composition of products:

$$IU_t = D_t / GDP_t = \sum_{i=1}^{n_t} a_{it} * b_{it} \tag{2.4}$$

and

$$D_t = IU_t * GDP_t. \quad (2.5)$$

The intensity-of-use technique first asseses the influence of changes in intensity of use versus GDP on metal consumption trends (chapter 4). The second step examines the two factors responsible for changes in intensity of use: (1) the product composition of income and (2) the material composition of products. The next step analyzes factors causing the product composition of income to change: intersectoral shifts, such as the growth of the service sector, and intrasectoral shifts, such as the rise of high technology products in the manufacturing sector. The final step focuses on the factors causing the material composition of products to change, such as resource-saving new technology, material substitution, and relative material prices (Tilton 1987).

2.3 Sectoral Intensity-of-Use Technique

The intensity-of-use technique is used to assess the relationship between aggregates, such as the level of overall economic development and total consumption of metals. Miller (1989) goes beyond this approach and tries to explain the characteristics of individual sectors at different degrees of disaggregation.

Miller assumes that total consumption of a given metal (D) is the summation of individual sectors in which this metal is used as an input:

$$D_t = \sum d_{jt} \tag{2.6}$$

where

j represents a given sector, and

d_j is the metal consumption of sector j.

The metal intensity of use of a sector is equal to the ratio of metal consumption of this sector to the sectoral output (x_{jt}), generally measured as value added or value of production:

$$iu_{jt} = d_{jt}/x_{jt}. \tag{2.7}$$

The total metal consumption is given by

$$D_t = IU_t * GDP_t = \sum iu_{jt} * x_{jt}. \tag{2.8}$$

This identity presents a starting point for investigating the relative importance of the individual sectors in the economy. By definition,

$$IU_t = D_t / GDP_t = \sum (x_{jt} / GDP_t) * iu_{jt}, \tag{2.9}$$

where the relative importance of sector j, w_{jt}, is

$$w_{jt} = x_{jt} / GDP_t. \tag{2.10}$$

Also by definition,

$$IU_t = D_t / GDP_t = \sum w_{jt} * iu_{jt}, \tag{2.11}$$

and total metal consumption is given by

$$D_t = (\sum w_{jt} * iu_{jt}) * GDP \tag{2.12}$$

Equation 2.12 shows that metal consumption is driven by changes in iu_{jt} and in w_{jt}, as well as changes in GDP. A shift in the mix of materials used to produce specific goods or a change in the mix of goods, or both, can cause a change in the pattern of consumption within a given sector. With respect to equation 2.5, iu_{jt} can serve as an estimator for a_{ij}, the metal composition of product of a sector and w_{jt} can serve as an estimator for b_{it}, the product composition of output.

2.4 Organization of Data

Metal consumption can be analyzed at four different levels of production. The first is metal consumption in overall economic activity. The second relates to the manufacture of all tangible goods. The third is metal consumption in the manufacture of all fabricated metal products, and the fourth is metal consumption in the manufacture of individual fabricated metal products (Miller 1989).

The International Standard Industrial Classification of all economic activities (ISIC) is the most widely used framework for the international comparison of national statistics, and the one used in this study. Figure 2.1 shows the organization of ISIC categories which consists of

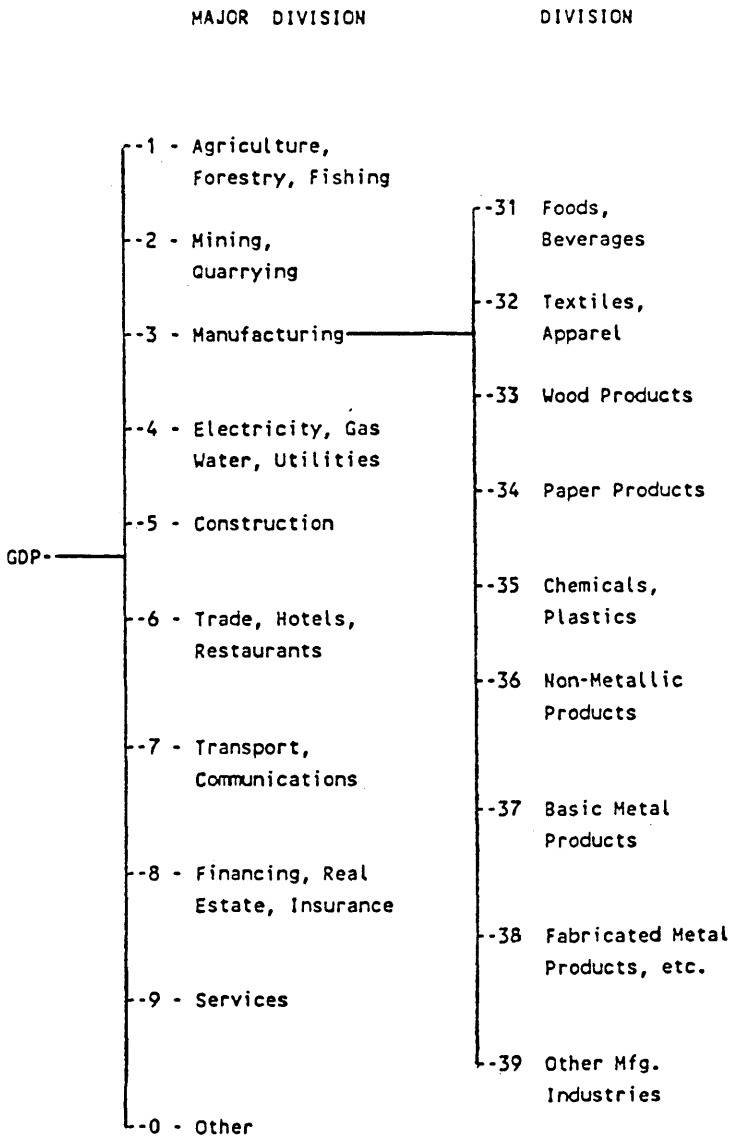


Figure 2.1 International Standard Industrial Classification of all Economic Activities (ISIC)

major divisions (one-digit codes), divisions (two-digit codes), major groups (three-digit codes), and groups (four-digit codes). The basis for reporting is the establishment, or kind-of-activity unit, the number of goods which may be included in a single enterprise. Establishments or kind-of-activity units are classified according to the principal class of goods produced and to their uses.

2.5 Specification of Sectoral Intensity-of-Use Model

For the SECs, data on metal consumption and economic activity allows the specification of a sectoral intensity-of-use model at a level of ISIC major groups.

The sum of the end-use groups closely approximates reported total apparent metal consumption and corresponds to the value of production reported under ISIC for the division of Manufacture of Fabricated Metal Products, Machinery, and Equipment.

To calculate intensity of use for the Division 38, FMP, we $su_{IU_{FMP}} = \sum w_{jt} * iu_{jt}$, in equation 2.11 and obtain:

$$IU_{FMP} = \sum w_{jt} * iu_{jt}, \tag{2.13}$$

where

$$w_{jt} = x_{jt} / FMP_t \tag{2.14}$$

$$iu_{jt} = d_{jt} / x_{jt}, \text{ and} \tag{2.7}$$

$$FMP_t = \sum x_{jt} \tag{2.15}$$

To calculate an intensity-of-use ratio for the manufacturing sector, we multiply equation 13 by the ratio of manufacturing to fabricated metal products:

$$IU_{MFG} = FMP_t/MFG_t \sum w_{jt} * iu_{jt}. \quad (2.16)$$

By including the ratio of manufacturing to GDP, we can relate end-use metal consumption to the economy as a whole:

$$IU_{GDP} = MFG_t/GDP_t * FMP_t/MFG_t * \sum w_{jt} * iu_{jt}. \quad (2.17)$$

This is an identity because

$$\sum w_{jt} * iu_{jt} = D_t/FMP_t, \text{ and} \quad (2.18)$$

$$IU_{GDP} = D_t/GDP_t = MFG_t/GDP_t * FMP_t/MFG_t * D_t/FMP_t \quad (2.19)$$

Equation 2.17 shows the relationship between end-use metal consumption trends and the metal fabrication division, the manufacturing sector and the overall economic activity. MFG_t/GDP_t reflects intersectoral shifts, while FMP_t/MFG_t and w_{jt} reflect intrasectoral shifts in the product composition of income. Intensity of use for major end-use groups, iu_{jt}, indicates changes in the pattern of metal composition within end-use groups.

Chapter 3

DETERMINANTS OF METAL CONSUMPTION GROWTH: AN ECONOMETRIC APPROACH

Growth rates of base metal consumption in the southern European countries have increased in tandem with those of the OECD countries. This rapid rate of growth following World War II slowed down around the mid-1970s and failed to recapture its previous performance.

What were the fundamental forces underlying the unforeseen discontinuity in demand growth? Was the decline in overall economic growth the main reason for a decrease in the growth of metal consumption in the SECs? Or were changing trends in the intensity of use primarily responsible?

There are several ways of finding answers to these questions that center on the relative significance of the various potential determinants of metal consumption. As a first approach, conventional demand analysis is used. The following demand equation is estimated for the individual members of the SECs:

$$Y_t = a\ Q^b{}_t\ P^c{}_{own(t-1)}\ \ P^d{}_{sub(t-1)}\ \ e^{u}t,$$

where

Y_t is total metal consumption in thousand tons in year t,

Q_t is total GDP in year t in millions of constant 1980 U.S. dollars,

$P_{own(t-1)}$ is the metal's real LME price, U.S.$/lb, lagged one year (using GDP deflator),

$P_{sub(t-1)}$ is the substitute metal's real LME price, U.S.$/lb (GDP deflator),

a is the scale factor,

b is the income elasticity,

c is the own price elasticity of metal demand,

d is the cross-price elasticity of metal demand,

u_t is the error term in year t.

This demand model posits a link between total metal consumption and total GDP, thus treating the demand for metal as a derived demand generated by aggregate demand for GDP. Demand is assumed to be influenced by the real world price of metal. Since consumption does not respond to price changes immediately, the metal price variable is used with a one-year lag. Calculations are based on London Metal Exchange prices (1960-1986) because domestic metal prices in the SECs are not available. In most cases correction was made for autocorrelation. Steel and nickel were left out because of a lack of reliable price data and limited time-series consumption data. Prices of substitute metals gave satisfactory results only in the case of aluminum in

which copper price was used for estimating cross-price effects. Table 3.1 shows the regression results.

The table indicates correct signs for all GDP parameters and for many of the price parameters. A majority of these values are statistically significant at the 5 percent level. The results suggest that there is a strong relationship between total metal consumption and total income; GDP appears to be the dominant variable driving time-dependent variations in consumption growth. In aluminum for all countries, and in other metals for Greece, Spain, and Turkey, the activity elasticity is greater than unity implying a growing metal intensity over the 1960-1986 period. The activity elasticities for the SECs are generally higher than in the CPEs and OECD countries.

The demand for a specific metal is affected by its own price and by the price of close substitutes. Greece, Portugal, and Turkey have higher price elasticities than Yugoslavia and Spain. In the case of zinc, wrong-signed price elasticities suggest that the SECs do not respond to variations in the LME prices. Overall, price elasticities are very low for these countries, implying low price responsiveness of metal consumption. This is not a totally unexpected finding. Price elasticities for these metals

Table 3.1 Elasticity Parameter Values of Metal Consumption in the SECs (1960-1986)

	Const	GDP	P_{t-1}	P_{subt-1}	R^2	F	DW
Aluminum				(Copper)			
Greece	-8.447[1]	2.707[1]	-0.113		99.07	966.8	2.20
Portugal	-32.468[1]	7.193[1]	0.448		92.96	88.1	1.89
Spain	-7.279[1]	2.565[1]	-0.078[1]	0.436[1]	93.15	83.6	1.74
Yugoslavia	-1.703[1]	1.320[1]	-0.243[1]	0.136[1]	97.45	267.6	1.94
Turkey	-11.737[1]	3.731[1]	-1.001[1]	1.014[1]	97.95	297.4	1.76
Lead							
Greece	-3.812	1.749[1]	-0.169		78.34	32.2	1.30
Portugal	0.288	0.967[1]	-0.320[1]		97.37	332.8	2.21
Spain	0.145	1.026[1]	0.138[1]		92.06	127.6	1.46
Yugoslavia	1.248[1]	0.810[1]	-0.093[2]		88.79	87.8	2.01
Turkey	0.170	1.090[1]	-0.129		65.40	18.6	2.02
Copper							
Greece	-4.440[1]	1.826[1]	-0.191[1]		96.94	285.6	1.94
Portugal	0.916	0.770[1]	-0.082		72.33	24.8	1.95
Spain	-0.831	1.122[1]	0.139		93.85	155.4	1.70
Yugoslavia	0.282	0.928[1]	-0.018		94.52	24.9	1.60
Turkey	0.375	1.034[1]	-0.274[1]		94.21	162.8	1.98
Zinc							
Greece	-0.884	1.132[1]	0.069		68.13	18.2	1.68
Portugal	-0.910	1.166[1]	0.127		70.88	23.1	0.94
Spain	-0.589	1.132[1]	0.187		84.01	59.3	1.94
Yugoslavia	1.178[1]	0.780[1]	-0.103[1]		84.68	53.1	1.92
Turkey	-7.947[1]	2.490[1]	0.114		90.25	92.6	1.79

[1] Statistically significant at the 5 % level.

[2] Statistically significant at the 10% level.

also tend to be very low in OECD countries, the CPEs, and many other developing countries (Dobozi 1987; Jack Faucett Associates 1986).

For a comparison, Table 3.2 shows price and income elasticities for aluminum and copper in selected countries. One reason for the low price elasticities may be the derived nature of demand for these metals; metals account for only a small proportion of final product price, limiting the scope for price-driven intermaterial substitution. Another reason might be the misspecification of price variable. Using domestic producer prices may have resulted in higher price elasticities for these countries, since users face domestic prices rather than LME prices.

To sum up, the high activity elasticities and relatively low price elasticities for the SECs show that the income effect far outweighs the price effect, implying that in the 1960-1986 period, economic growth tended to override price incentives for material conservation and substitution.

Table 3.2 GDP, Price and Oil Price Elasticities of Aluminum and Copper for Selected Countries, 1960-1984

	Elasticities		
	GDP	Own Price	Oil Price
Aluminum			
United States	1.91	-0.20	-0.28
Canada	1.44	-0.17	-0.27
France	1.22	0.13	-0.01
West Germany	2.17	-0.11	-0.07
Norway	2.81	-0.26	-0.51
Sweden	2.12	-0.53	-0.09
Japan	2.10	0.13	-0.44
Argentina	2.40	-1.12	0.36
Brazil	1.63	-0.19	-0.02
Mexico	3.45	0.60	-0.60
Egypt	1.95	-1.91	0.88
South Korea	3.57	0.98	-0.76
USSR	1.31	0.25	-0.07
Bulgaria	4.17	-0.02	-0.21
Czechoslovakia	4.05	0.22	-0.51
East Germany	1.88	0.11	-0.13
Hungary	3.01	-0.46	-0.05
Poland	1.80	0.46	-0.16
Romania	2.48	-0.09	-0.01
Copper			
United States	0.70	-0.25	-0.29
Canada	0.65	-0.15	-0.40
France	0.45	0.16	-0.00
West Germany	0.83	-0.11	-0.09
Norway	-0.74	-1.06	0.07
Sweden	0.19	-0.24	0.01
Japan	1.14	-0.25	-0.24
Argentina	1.24	0.02	0.08
Brazil	2.04	0.21	-0.28
Chile	-0.25	-0.11	-0.00
India	-0.58	-0.56	0.08
South Korea	1.69	-0.18	0.57
USSR	0.77	-0.02	0.02
Bulgaria	1.79	-0.04	-0.07
Czechoslovakia	1.32	0.07	0.04
East Germany	0.92	0.02	0.02
Poland	1.47	-0.14	-0.08
Romania	2.98	0.11	-0.19

Source: Jack Faucett Associates 1986; Dobozi 1987

Chapter 4

RELATIVE IMPORTANCE OF GDP AND INTENSITY-OF-USE

To analyze long-run trends in metal demand, the intensity-of-use technique will be used to separate the influence of intensity of use from that of GDP. This will be done prior to identifying the factors determining intensity of use, such as material composition of product and product composition of income (chapter 5).

The econometric modeling of the previous chapter showed statistically that GDP growth drives short consumption growth in the SECs. Although the estimated coefficients are partial elasticities, the models suggest that GDP is the dominant variable. In order to isolate the effect of GDP from possible other factors, a decomposition analysis is used.

The decline in metal consumption relative to projected growth, assuming the former (1960-1973) trend growth rate, is separated into two components: the economic slowdown effect and the intensity-of-use effect over the 1974-1986 period in which a significant deviation occurred from the historical consumption pattern (Table 4.1). The slowdown effect explains the amount of decline in consumption due to

Table 4.1 Growth in GDP, Metal Consumption, and Intensity-of-Use for the SECs
(Average annual rate of change in percentages)

	GDP		Metal Consumption		Intensity of Use	
	60-73	73-86	60-73	73-86	60-73	73-86
Aluminum						
Spain	6.58	1.77	18.72	0.12	12.15	-1.64
SEC-4	6.24	3.33	12.03	6.09	5.79	2.76
SEC-5	6.43	2.50	14.97	3.63	8.54	1.14
Copper						
Spain	6.58	1.77	9.15	-1.17	2.80	-2.94
SEC-4	6.24	3.33	8.26	5.33	1.97	1.99
SEC-5	6.43	2.50	8.58	2.72	2.25	0.22
Steel						
Spain	6.58	1.77	12.67	-3.43	6.10	-5.20
SEC-4	6.24	3.33	8.09	2.57	1.85	-0.76
SEC-5	6.43	2.50	10.25	-0.77	3.82	-2.50

Source: World Bank data tape, Metallgesellschaft (various issues); International Iron and Steel Institute, Statistical Yearbook (various issues).

slower economic growth in the 1974-1986 period. The intensity-of-use effect captures the combined influence of several different factors, such as conservation and structural shifts in output. The undetermined proportion of this decline is called joint effect and represents the combined effect of both slowdown and intensity-of-use effects. These effects are calculated first by holding intensity-of-use growth constant at the 1960-1973 historical rate and using actual GDP growth rates for 1974-1986, and second by holding GDP growth constant at historical rates and using actual intensity-of-use growth rates.

The detailed decomposition analysis is done for only three major metals, but results appear to apply to the rest of the metals. Aluminum, copper, and steel are used for SEC-5, SEC-4, and Spain.

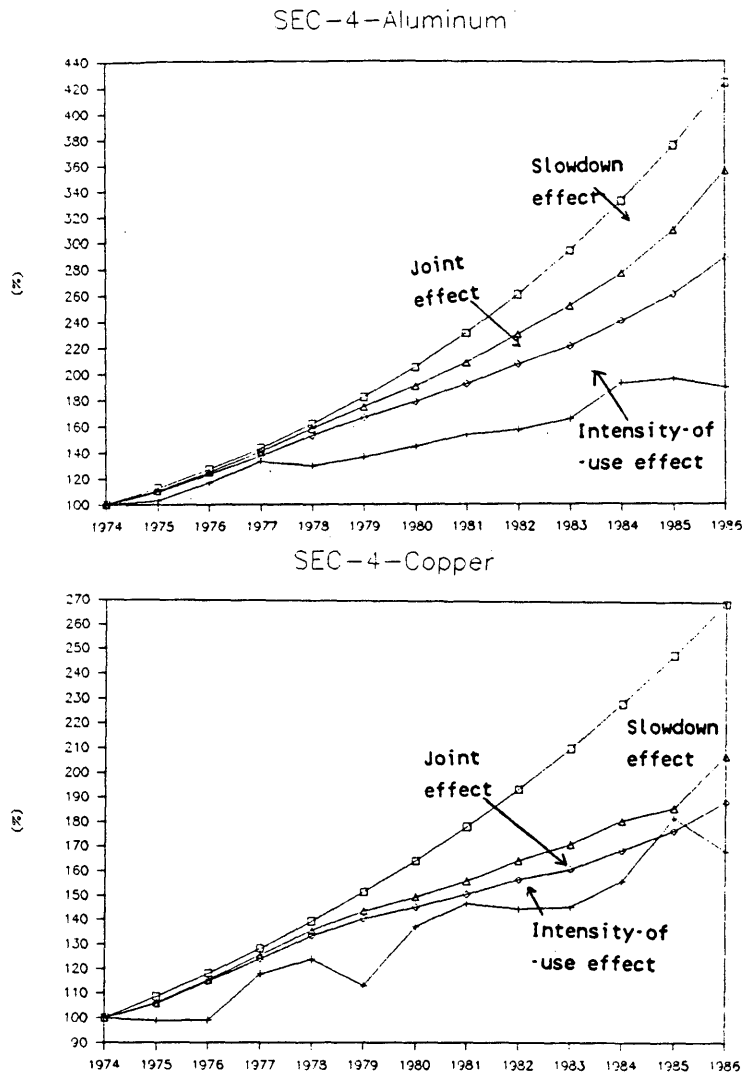
Table 4.2 shows the dominance of the economic slowdown in shaping metal demand trends for the end year 1986. Figures 4.1-4.5 provide relative weights on an annual basis for the slowdown effect, the intensity-of-use effect, and joint effect.

For aluminum, the slowdown effect amounted to about 25 percent of the total decline; intensity-of-use effect, about 45 percent; and joint effect, about 30 percent. The weight

Table 4.2 Decomposition of Decline in the SEC Metal Consumption in 1986, Actual Values (in percentages)

Commodity	Total Decline in Metal Consumption	Slowdown Effect	Intensity-of Use Effect	Joint Effect
Aluminum				
Spain	837	214(26)[a]	373(44)	249(30)
SEC-4	234	67(29)	99(42)	67(29)
SEC-5	455	81(18)	207(45)	166(36)
Copper				
Spain	210	69(33)	83(39)	58(28)
SEC-4	101	62(61)	20(20)	19(19)
SEC-5	150	72(48)	46(31)	31(21)
Steel				
Spain	384	57(15)	177(46)	148(39)
SEC-4	134	51(38)	56(42)	27(20)
SEC-5	242	58(24)	111(46)	72(30)

Note: a. Percent weight in total decline is presented in parenthesis.



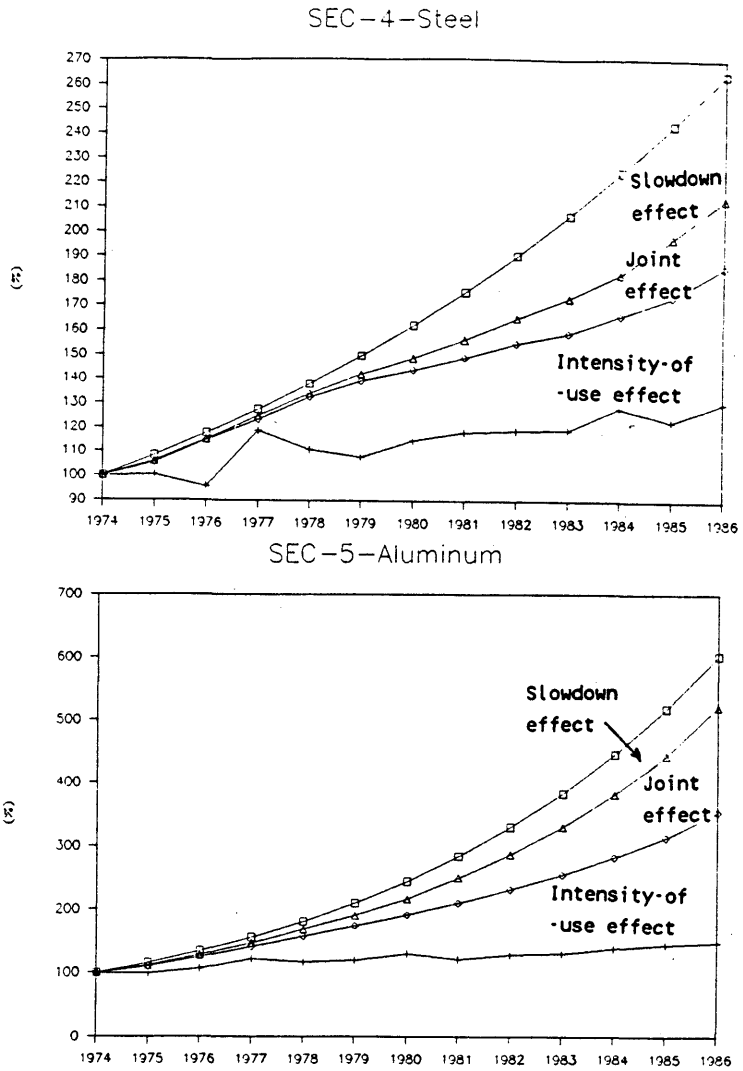
□ Projected consumption assuming former (1960-73) trend growth rate

◇ Calculated consumption based on 1974-86 actual GDP growth but holding intensity of use constant at 1960-73 level

Δ Calculated consumption based on 1974-86 actual intensity-of-use growth but holding GDP growth constant at 1960-73 level

\+ Actual Consumption

Figure 4.1 Decomposition of Decline in SEC-4 Aluminum and Copper Consumption, 1974-1986



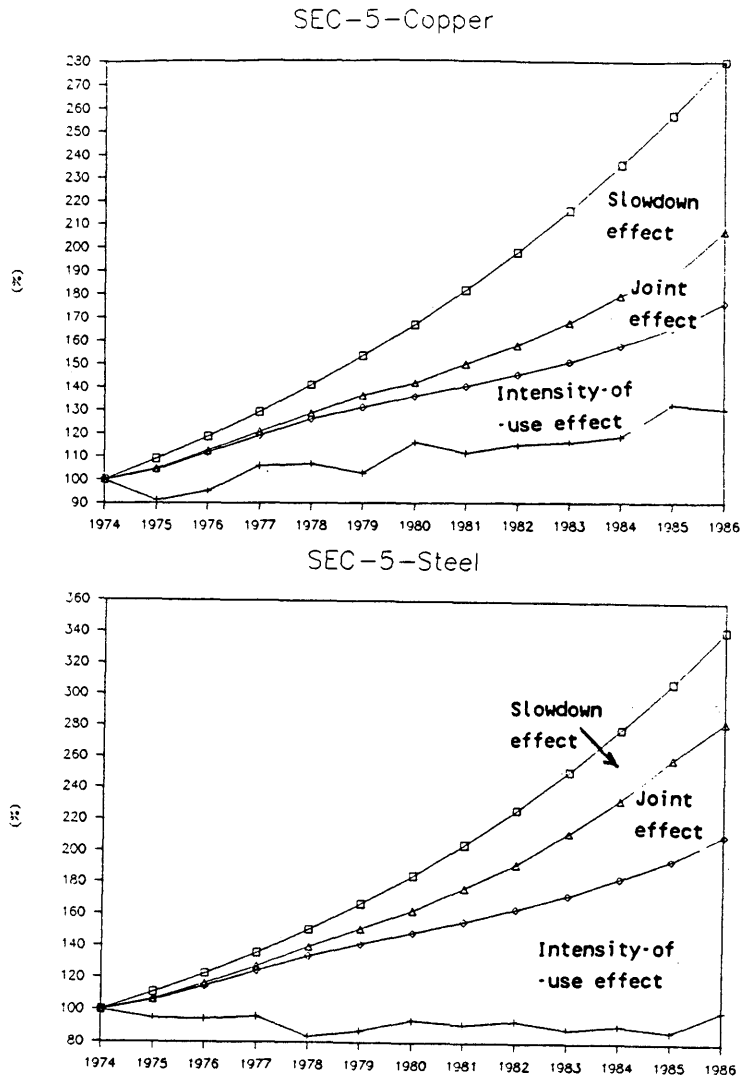
□ Projected consumption assuming former (1960-73) trend growth rate

◇ Calculated consumption based on 1974-86 actual GDP growth but holding intensity of use constant at 1960-73 level

Δ Calculated consumption based on 1974-86 actual intensity-of-use growth but holding GDP growth constant at 1960-73 level

\+ Actual Consumption

Figure 4.2 Decomposition of Decline in SEC-4 Steel and in SEC-5 Aluminum Consumption, 1974-1986



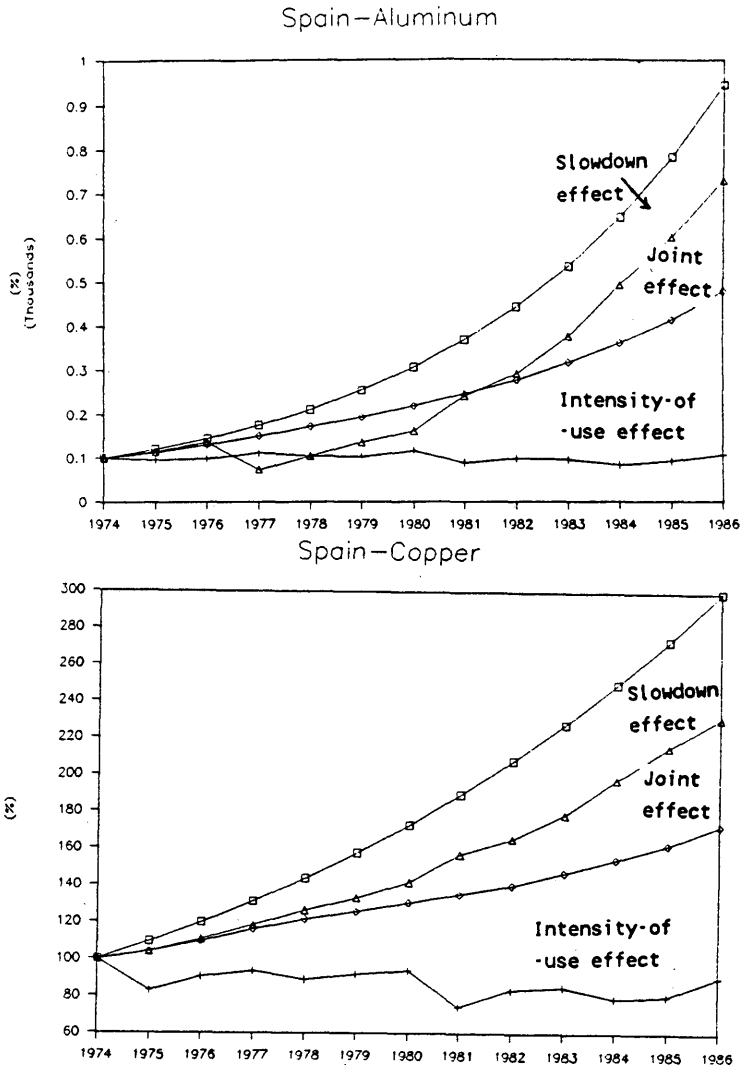
□ Projected consumption assuming former (1960-73) trend growth rate

◇ Calculated consumption based on 1974-86 actual GDP growth but holding intensity of use constant at 1960-73 level

Δ Calculated consumption based on 1974-86 actual intensity-of-use growth but holding GDP growth constant at 1960-73 level

\+ Actual Consumption

Figure 4.3 Decomposition of Decline in SEC-5 Copper and Steel Consumption, 1974-1986



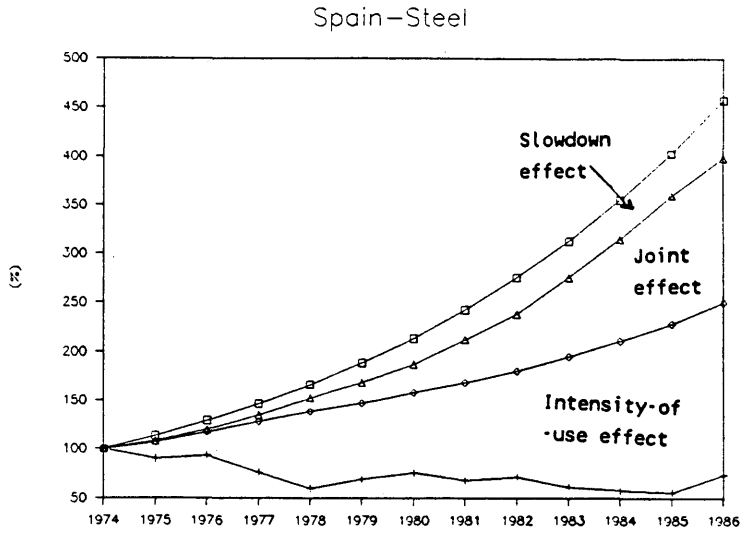
□ Projected consumption assuming former (1960-73) trend growth rate

◇ Calculated consumption based on 1974-86 actual GDP growth but holding intensity of use constant at 1960-73 level

Δ Calculated consumption based on 1974-86 actual intensity-of-use growth but holding GDP growth constant at 1960-73 level

\+ Actual Consumption

Figure 4.4 Decomposition of Decline in Spain's Aluminum and Copper Consumption, 1974-1986



□ Projected consumption assuming former (1960-73) trend growth rate
◇ Calculated consumption based on 1974-86 actual GDP growth but holding intensity of use constant at 1960-73 level
Δ Calculated consumption based on 1974-86 actual intensity-of-use growth but holding GDP growth constant at 1960-73 level
\+ Actual Consumption

Figure 4.5 Decomposition of Decline in Spain's Steel Consumption, 1974-1986

of the slowdown effect for copper in Spain is only 33 percent, and in SEC-4, 61 percent. In the case of steel, the intensity-of-use effect again is dominant over the slowdown effect, about 45 to 15 percent in Spain and 42 to 38 percent in SEC-4. The joint effect of these two factors also amounted high percentages. We cannot calculate the real magnitutes of the slowdown effect and intensity-of-use effect since we cannot decide distribution of the joint effect to these two effects.

The growth of GDP dropped sharply in the SECs after the first oil shock of 1973. In SEC-5, the rate of growth in GDP dropped from 6.43 percent in the 1960-1973 period to 2.50 in the 1974-1986 period. The drop in GDP growth was more severe in Spain than in the other countries, falling from 6.58 to 1.77 percent over the 1974-86 period. In SEC-4 the drop was around 50 percent of the previous period's GDP growth.

The slowdown in GDP growth that occurred after 1973 in the SECs and the slowdown in the growth of intensity of use contributed significantly to the decline in metal consumption. The importance of intensity of use is discussed in the next chapter.

Chapter 5

COMPARATIVE ANALYSIS OF INTENSITY-OF-USE DETERMINANTS

Material composition of products and product composition of income are the two main factors underlying intensity-of-use trends at the final stage of consumption. The assessment of the influence of these factors on metal consumption trends is limited by availability of data at the appropriate degrees of disaggregation. The data series for economic activity are available for GDP, ISIC major divisions, and ISIC divisions. This makes a quantitative analysis of changes in the composition of income possible at three different levels of economic activity.

Metal consumption data is available only at the final fabrication stage of metal products. This corresponds to the 2-digit ISIC definition. The product composition of income, the mix of goods and services consumed as reflected by their share of GDP, is examined with respect to shifts among economic sectors at the major division level. This means a focusing on the ratio of manufacturing output to GDP: how it has changed over time and what other shifts have occurred among various sectors at this level.

The contribution of output from Division 38, Fabricated

Metal Products, Machinery, and Equipment, to the output of Major Division 3, Manufacturing, is examined in the second part of this chapter. Examining changes in the ratio FMP/MFG and its influence on the MFG/GDP ratio gives us a key to highlight intrasectoral shifts within the manufacturing sector caused by changes in the output of fabricated metal products.

5.1 Intersectoral Shifts among Major Divisions

It is assumed that intensity of use increases as a country's manufacturing, construction, and other material-intensive activities expand. At a certain stage of development, consumer demand shifts toward services and, because the service sector is less material intensive, a downward shift in intensity of use occurs as per capita income rises (Malenbaum 1973). Although some new service activities replace existing systems in such a way that the manufacturing sector is adversely affected, these shifts toward service and knowledge-intensive activities can also create demand for technologically advanced new products.

Table 5.1 shows intersectoral changes in the composition of GDP in the SECs over 1960-1985. Since 1960, the manufacturing sectors in Greece and Spain have more or

Table 5.1 Gross Domestic Product Originating in Major Sectors, 1960-1985
(in percentages)

	1960	1965	1970	1975	1980	1985
Greece						
Agriculture	20	22	16	17	16	16
Manufacturing	15	14	17	18	17	16
Services	10	10	10	10	11	12
Spain						
Agriculture	n/a	15	11	9	7	6
Manufacturing	n/a	25	25	25	28	27
Services	n/a	8	9	16	13	n/a
Turkey						
Agriculture	37	31	27	26	21	17
Manufacturing	12	14	15	15	20	23
Services	5	5	5	11	11	12
Yugoslavia						
Agriculture	23	22	16	14	11	11
Manufacturing	n/a	n/a	27	28	28	35
Services	6	9	14	15	14	12

Source: The World Bank data tape (1987)

less retained their share of GDP, while in Yugoslavia and Turkey, shares increased from 27 percent to 35 percent and from 12 percent to 23 percent, respectively. The manufacturing sector maintained or increased its share in GDP in this period. The size of the manufacturing sector is larger in Yugoslavia and Spain than in Greece and Turkey.

The share of services, on the other hand, has increased in Greece and Turkey, while a slight decrease has occurred in Spain and Yugoslavia since the mid-1970s. The share of agriculture has declined drastically over time in all of these countries, but still maintains a significantly high share in Turkey and Greece. In Yugoslavia and Spain, this sector is relatively smaller than in other countries of the group.

The conclusion from the analysis of intersectoral shifts is that they tend to increase intensity of use particularly in the lesser developed SECs which are catching up with industrialization with a focus on the expansion of the relatively material-intensive manufacturing industries.

5.2 Intrasectoral Shifts within the Manufacturing Sector

Intrasectoral shifts within Major Group 3, Manufacturing, reveal some interesting differences between countries. To investigate the overall shift in the mix of goods produced, we focus on ISIC Division 38, Fabricated Metal Products, Machinery and Equipment, in which metals are used as an input for the production of final goods. In Table 5.2, the output of fabricated metal products, machinery and equipment as a percentage of the manufacturing sector is presented for the SECs.

Table 5.2 Fabricated Metal Products, Machinery and Equipment[1] as a Percent of Manufacturing Output in the SECs

	1970	1978	1985
Greece	17	15	15
Portugal	15	18	16
Spain	22	26	24
Turkey	14	20	16
Yugoslavia	31	31	28

[1] This sector includes fabricated metal products, machinery, electrical equipment, transport equipment and scientific measuring equipment.

Source: Appendix C

These products account for a significant share of the

manufacturing sector for all countries. The share of this division is relatively higher in Yugoslavia and Spain than in Greece, Turkey, and Portugal. Although a slight decrease has been experienced in the relative share of this division in the manufacturing sector after the mid-1970s in Yugoslavia and Spain, it maintained its important share during 1970-1985 in the other countries.

5.3 Trends in the Production of High Technology Products

High technology products are defined as high-unit value and low material-intensive goods associated with the computer, telecommunication, and scientific and medical industries. A rise in their share of output for fabricated metal products, machinery and equipment can also cause a decline in intensity of use at the division level. Studies by Castro (1986) and Miller (1989) show that the high technology industries increased their share of output in manufacturing sector over time in the United States and West Germany.

For these products, data are not available for a detailed quantitative analysis, but the decrease in the ratio of value of production (PV) to value added (VA) in the SECs suggests that the share of high technology products

increased in these countries over the last decade (Table 5.3). Lower values of PV/VA ratio corresponds higher value added. These results suggest a trend to lower metal intensity of use within the fabricated metal products, machinery and equipment division.

Table 5.3 The Ratio of Value of Production to Value Added in Fabricated Metal Products, Machinery and Equipment Division

	1975	1980	1985
Greece	2.5	2.4	2.4
Portugal	2.1	2.5	2.7
Spain	2.8	2.3	2.5
Turkey	3.0	2.5	2.8
Yugoslavia	3.2	2.8	2.7

5.4 Determinants of Intensity-of-Use

This section examines and compares individual trends of metal intensity of use in fabricated metal products for each SEC. Equation 2.17 states the sectoral model for the analysis:

$$IOU = MFG/GDP * FMP/MFG * \sum w_j * iu_j$$

The ratio of MFG/GDP and FMP/MFG significantly influences the intensity of use of the economy as a whole (IOU_{GDP}). And since $\sum w_j * iu_j = IOU_{FMP}$, equation 2.17 can be expressed as

$IOU = MFG/GDP * FMP/MFG * IOU_{FMP}$.

IOU_{FMP}, intensity-of-use for Division 38, Fabricated Metal Products, Machinery, and Equipment, indicates the point of entry for metal into the economy. Tables 5.4-5.8 present intensity of use by end-use group for aluminum, lead, copper, zinc, and steel.

The level of intensity-of-use for the fabricated metal products, IOU_{FMP}, is relatively higher in Greece, Portugal, and Yugoslavia than in Turkey and Spain. And for Greece and Portugal, IOU_{FMP} has been increasing over the period 1970-1985.

The higher levels of metal intensity of use for GDP in Yugoslavia result from the high share of manufacturing in the overall economy and the high share of fabricated metal products in the manufacturing sector as well as high IOU_{FMP} values. Spain, the largest consumer of all metals, has high MFG/GDP and FMP/MFG ratios, but because of low IOU_{FMP} values, intensity of use is significantly lower than in Yugoslavia. In Greece and Portugal, low MFG/GDP and FMP/MFG ratios result in low IOU_{GDP} values. For Turkey, low values of all three factors bring about relatively low IOU_{GDP} values.

Table 5.4 Aluminum Intensity of Use in the SECs Calculated by Major End-Use Group 1970, 1978, 1985

	IOU =	MFG/GDP *	FMP/MFG *	IOU_{FMP}
Greece				
1970	1.0	0.17	0.17	35.5
1978	1.8	0.19	0.15	63.4
1985	2.1	0.17	0.15	80.9
Portugal				
1970	n/a	n/a	0.15	n/a
1978	0.9	0.12	0.18	41.5
1985	1.2	0.09	0.16	84.5
Spain				
1970	0.9	0.25	0.22	15.7
1978	1.1	0.28	0.26	15.2
1985	0.9	0.26	0.24	14.7
Turkey				
1970	0.4	0.16	0.14	17.5
1978	0.7	0.18	0.20	22.0
1985	1.6	0.19	0.16	53.2
Yugoslavia				
1970	2.4	0.27	0.31	30.0
1978	2.4	0.27	0.31	28.7
1985	2.8	0.35	0.28	28.9

Source: Appendix B and C

Table 5.5 Lead Intensity of Use in the SECs Calculated by Major End-Use Group 1970, 1978, 1985

	IOU =	MFG/GDP *	FMP/MFG *	IOU_{FMP}
Greece				
1970	1.0	0.17	0.17	34.3
1978	0.8	0.19	0.15	26.7
1985	0.5	0.17	0.15	20.9
Portugal				
1970	n/a	n/a	0.15	n/a
1978	0.7	0.12	0.18	34.2
1985	1.0	0.09	0.16	69.1
Spain				
1970	0.5	0.25	0.22	9.4
1978	0.5	0.28	0.26	7.4
1985	0.4	0.26	0.24	7.2
Turkey				
1970	0.2	0.16	0.14	9.6
1978	0.1	0.18	0.20	3.4
1985	0.3	0.19	0.16	10.3
Yugoslavia				
1970	1.2	0.27	0.31	14.4
1978	1.3	0.27	0.31	15.5
1985	1.6	0.35	0.28	16.3

Source: Appendix B and C

Table 5.6 Copper Intensity of Use in the SECs Calculated by Major End-Use Group 1970, 1978, 1985

	IOU =	MFG/GDP *	FMP/MFG *	IOU_{FMP}
Greece				
1970	0.5	0.17	0.17	16.3
1978	0.6	0.19	0.15	20.0
1985	0.9	0.17	0.15	35.7
Portugal				
1970	n/a	n/a	0.15	n/a
1978	0.7	0.12	0.18	34.0
1985	0.6	0.09	0.16	41.9
Spain				
1970	0.7	0.25	0.22	12.8
1978	0.6	0.28	0.26	8.3
1985	0.5	0.26	0.24	8.1
Turkey				
1970	0.4	0.16	0.14	18.0
1978	0.4	0.18	0.20	12.7
1985	1.1	0.19	0.16	35.7
Yugoslavia				
1970	2.2	0.27	0.31	26.5
1978	1.8	0.27	0.31	22.5
1985	1.9	0.35	0.28	20.3

Source: Appendix B and C

Table 5.7 Zinc Intensity of use in the SECS Calculated by Major End-Use Group 1970, 1978, 1985

	IOU =	MFG/GDP *	FMP/MFG *	IOU_{FMP}
Greece				
1970	0.3	0.17	0.17	11.7
1978	0.5	0.19	0.15	16.0
1985	0.4	0.17	0.15	13.9
Portugal				
1970	n/a	n/a	0.15	n/a
1978	0.8	0.12	0.18	35.3
1985	0.3	0.09	0.16	22.1
Spain				
1970	0.5	0.25	0.22	9.3
1978	0.5	0.28	0.26	6.8
1985	0.4	0.26	0.24	6.7
Turkey				
1970	0.2	0.16	0.14	11.0
1978	0.4	0.18	0.20	12.7
1985	0.7	0.19	0.16	23.4
Yugoslavia				
1970	1.4	0.27	0.31	17.0
1978	0.9	0.27	0.31	10.5
1985	1.4	0.35	0.28	14.6

Source: Appendix B and C

Table 5.8 Steel Intensity-of-use in the SECs Calculated by Major End-Use Group 1970, 1978, 1985

	IOU =	MFG/GDP *	FMP/MFG *	IOU_{FMP}
Greece				
1970	25.4	0.17	0.17	904.6
1978	33.4	0.19	0.15	1183.6
1985	36.9	0.17	0.15	1422.2
Portugal				
1970	n/a	n/a	0.15	n/a
1978	66.9	0.12	0.18	3095.4
1985	43.0	0.09	0.16	2989.3
Spain				
1970	58.2	0.25	0.22	1041.7
1978	34.5	0.28	0.26	465.7
1985	29.5	0.26	0.24	472.6
Turkey				
1970	55.2	0.16	0.14	2433.7
1978	61.8	0.18	0.20	1744.8
1985	68.8	0.19	0.16	2325.0
Yugoslavia				
1970	83.9	0.27	0.31	1027.0
1978	81.0	0.27	0.31	987.3
1985	67.3	0.35	0.28	701.3

Source: Appendix B and C

Chapter 6

CONCLUSIONS AND IMPLICATIONS

This study analyzed metal demand trends over the 1960-1986 in Greece, Portugal, Spain, Turkey, and Yugoslavia, all rapidly industrializing countries of southern Europe. Demand growth of aluminum, copper, lead, and zinc slumped around mid-1970s in Spain, while those of other SECs experienced only a slowdown, but generally no absolute decline at approximately the same point of time. In the case of steel, however, all countries followed a similar path: a sudden drop in demand growth followed by decreasing demand trends.

Intensity of metal use of these countries, however, has shown a different pattern from demand growth. The largest consumer, Spain, exhibits relatively low intensity-of-use values. Yugoslavia has the highest intensity of use for all the metals, except nickel.

Conventional demand functions show that GDP is the dominant variable, driving demand trends in these countries and overriding the effect of own price and cross-price effects. In explaining the slowdown in metal demand, as a departure from historical growth trends, we have shown that income and intensity-of-use jointly determine the lagging

demand growth in the 1974-1986 period. The decomposition analysis, used to separate out the relative weights of slowdown and intensity-of-use effects, shows that intensity-of-use had a relatively higher influence than GDP.

In explaining the factors behind intensity-of-use behavior, we suggest that both intersectoral and intrasectoral shifts played a role in changing the product composition of income and the material composition of product. The share of agriculture has decreased significantly and the manufacturing sector has increased its share over the last decade in these countries. The share of services, however, has also increased significantly and to some extent offset the intensity-reducing impact of the falling share of agriculture.

The sectoral model of the intensity-of-use technique indicates the importance of the weight of the manufacturing sector in overall economic activity, and the share of fabricated metal products within the manufacturing sector. These two factors played a major role in determining the intensity of use, along with intensity-of-use of fabricated metal products. High shares of manufacturing in GDP and the fabricated metal products, machinery, and equipment division in the manufacturing sector explain to a great extent the high intensity of use for base metals in Yugoslavia. In

Greece, Portugal, and Spain these shares are also very high, but shifts toward the service sector and high value-added products such as high technology goods, tended to offset these effects and, as a net impact, resulted in lower intensity of use of the fabricated metals, machinery, and equipment. The differences in intensity of use of major ISIC groups show different metal composition of products in the fabrication of metal products in these countries.

The increasing share of manufacturing in GDP and fabricated metal products in manufacturing acted toward increasing intensity of use in the SECs, except Spain, compensating for the decreasing intensity-of-use effects associated with technological changes and intermaterial substitution.

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APPENDIX A: MACROECONOMIC DATA

greece defla 1980 3.613 ratio 0.0847783748
macro data exch 1980 42.617 constant million 1980 $

year	cons. gdp	cons. mfg	cons.svcs	cons. gdi	population	gdp/ca
1960	12156.12	1562.47	4566.84	2399.82	8,327,000	1459.8
1961	13511.47	1685.90	4911.04	2928.92	8,398,000	1608.8
1962	13718.67	1774.75	5195.13	2958.51	8,448,000	1623.9
1963	15109.20	1921.16	5591.90	3336.03	8,480,000	1781.7
1964	16356.97	2164.99	6076.66	4285.38	8,510,000	1922.0
1965	17893.32	2386.17	6601.69	4903.58	8,550,000	2092.7
1966	18984.68	2600.32	7124.77	4508.68	8,614,000	2203.9
1967	20025.25	2827.02	7554.01	4607.03	8,716,000	2297.5
1968	21359.83	3154.43	8080.82	5099.76	8,741,000	2443.6
1969	23474.37	3614.70	8756.08	6391.87	8,773,000	2675.7
1970	25341.70	4176.69	9542.57	7122.15	8,793,000	2882.0
1971	27145.86	4627.71	10281.58	7568.42	8,831,000	3073.9
1972	29556.37	4992.77	11292.90	8432.40	8,889,000	3325.0
1973	31720.68	5869.04	12377.39	10733.20	8,929,000	3552.5
1974	30566.59	5702.70	12479.04	8227.74	8,962,000	3410.6
1975	32416.03	6014.52	13122.17	8118.38	9,047,000	3583.0
1976	34477.58	6615.17	14048.12	8289.63	9,167,000	3761.0
1977	35659.65	6709.62	14763.98	8382.89	9,309,000	3830.6
1978	38047.94	7150.29	15677.56	9057.72	9,430,000	4034.7
1979	39452.04	7545.11	16456.58	9946.28	9,548,000	4131.9
1980	40143.41	7555.87	16831.98	9493.91	9,643,000	4162.9
1981	40016.67	7465.92	17033.42	8154.41	9,729,000	4113.1
1982	39944.94	7151.56	17273.93	7929.32	9,792,000	4079.3
1983	40077.20	7061.61	17796.08	7333.33	9,840,000	4072.8
1984	41130.23	7193.45	18356.89	7371.48	9,896,000	4156.2
1985	42088.23	7290.94	22574.79	7388.44	9,935,000	
1986	42685.88				9,981,000	

Source: The World Bank Data Tape (1987)

APPENDIX A: MACROECONOMIC DATA

portugal defla 1980 1.726 ratio 0.0344772482
macro data exch 1980 50.062 constant million 1980 $

year	cons. gdp	cons. mfg	cons.svcs	cons. gdi	population	gdp/ca
1960	8346.94	0.00	0.00	2503.05	8,943,100	933.3
1961	8808.94	0.00	0.00	2540.97	8,937,600	985.6
1962	9391.60	0.00	0.00	2868.51	9,019,800	1041.2
1963	9943.24	0.00	0.00	2851.27	9,081,600	1094.8
1964	10570.72	0.00	0.00	3213.28	9,122,500	1158.7
1965	11360.25	0.00	0.00	3616.66	9,128,900	1244.4
1966	11822.25	0.00	0.00	3992.47	9,108,800	1297.8
1967	12715.21	0.00	0.00	4126.93	9,103,000	1396.8
1968	13842.62	0.00	0.00	3999.36	9,115,100	1518.6
1969	14135.67	0.00	0.00	4202.78	9,097,200	1553.8
1970	15425.12	0.00	0.00	5137.11	9,044,200	1705.5
1971	16449.10	0.00	0.00	5299.15	8,990,500	1829.6
1972	17766.13	0.00	0.00	6050.76	8,970,500	1980.5
1973	19755.46	0.00	0.00	6957.51	8,976,000	2200.9
1974	19983.01	0.00	0.00	6416.22	9,098,300	2196.3
1975	19114.19	0.00	0.00	4619.95	9,425,800	2027.8
1976	20431.22	0.00	0.00	5154.35	9,666,000	2113.7
1977	21575.86	0.00	9598.47	6264.52	9,735,900	2216.1
1978	22310.23	0.00	10015.64	6685.14	9,796,300	2277.4
1979	23692.77	0.00	9998.40	7257.46	9,856,500	2403.7
1980	24665.02	0.00	10381.10	8260.75	9,909,300	2489.0
1981	24861.54	0.00	10684.50	8591.73	9,956,700	2496.9
1982	25657.97	0.00	11053.41	9053.73	9,997,100	2566.5
1983	25633.83	0.00	10881.02	6998.88	10,099,000	2538.2
1984	25199.42	0.00	10650.02	5674.96	10,164,000	2479.2
1985	26064.80		11005.14	5309.50	10,229,000	
1986	27765.54			5895.61	10,283,000	

Source: The World Bank Data Tape (1987)

APPENDIX A: MACROECONOMIC DATA

spain defla 1980 4.095 ratio 0.0571113776
macro data exch 1980 71.702 constant million 1980 $

year	cons. gdp	cons. mfg	cons.svcs	cons. gdi	population	gdp/ca
1960	72485.76	0.00	0.00	11593.61	30,455,000	2380.0
1961	81069.60	0.00	0.00	15283.00	30,744,000	2636.9
1962	88608.31	0.00	0.00	18355.60	31,067,000	2852.1
1963	96369.74	0.00	0.00	19823.36	31,393,000	3069.7
1964	102332.17	21313.97	40377.74	21827.97	31,723,000	3225.8
1965	108814.30	23815.44	42879.22	25762.94	32,057,000	3394.4
1966	116490.08	26471.12	45689.10	29006.87	32,394,000	3596.0
1967	121527.30	28104.51	48190.58	29075.40	32,735,000	3712.4
1968	129757.05	30257.61	51286.02	31062.88	33,079,000	3922.6
1969	141362.09	34403.90	56306.11	36368.53	33,427,000	4228.9
1970	147130.33	37345.13	59669.97	35934.48	33,779,000	4355.6
1971	154417.74	39698.12	63016.69	35243.43	34,190,000	4516.4
1972	166987.95	45780.48	67602.74	40903.17	34,498,000	4840.5
1973	180106.44	50943.35	72474.34	46066.04	34,810,000	5173.9
1974	190409.34	54147.30	76266.53	50949.06	35,147,000	5417.5
1975	192493.90	53913.14	78859.39	49127.21	35,515,000	5420.0
1976	198290.70	55757.84	81789.20	48447.58	35,937,000	5517.7
1977	204829.96	58019.45	85678.49	46500.08	36,367,000	5632.3
1978	208747.80	59595.72	87637.41	44061.43	36,778,000	5675.8
1979	209581.63	59567.17	88785.35	43341.82	37,108,000	5647.8
1980	212123.09	58539.16	89253.66	44718.21	37,386,000	5673.8
1981	213065.42	58464.92	89824.78	42576.53	37,654,000	5658.5
1982	214950.09	57579.69	91817.96	41171.59	37,935,000	5666.2
1983	219467.61	58579.14	94148.11	39766.65	38,228,000	5741.0
1984	224247.83	58601.98	96843.78	38384.56	38,415,000	5837.5
1985	229267.92	59607.14	98334.37	39977.96	38,602,000	
1986	237544.49			43781.58	38,860,000	

Source: The World Bank Data Tape (1987)

APPENDIX A: MACROECONOMIC DATA

turkey	defla 1980	21.226	ratio 0.2791498987			
macro data	exch 1980	76.038	constant million 1980 $			
year	cons. gdp	cons. mfg	cons.svcs	cons. gdi	population	gdp/ca
1960	19931.30	2065.71	5164.27	3014.82	27,509,000	724.5
1961	20266.28	2400.69	5359.68	3126.48	28,202,000	718.6
1962	21494.54	2484.43	5778.40	3321.88	28,912,000	743.4
1963	23532.34	2847.33	6336.70	3712.69	29,640,000	793.9
1964	24509.36	3098.56	6727.51	3796.44	30,386,000	806.6
1965	25151.41	3377.71	7062.49	3768.52	31,151,000	807.4
1966	28082.48	3880.18	7983.69	5052.61	31,944,000	879.1
1967	29366.57	4298.91	8318.67	5108.44	32,756,000	896.5
1968	31320.62	4940.95	9128.20	5638.83	33,590,000	932.4
1969	32995.52	5443.42	9798.16	5806.32	34,445,000	957.9
1970	34586.67	5610.91	10607.70	7118.32	35,321,000	979.2
1971	37741.07	6085.47	11612.64	7174.15	36,215,000	1042.1
1972	40225.50	6504.19	13120.05	7760.37	37,132,000	1083.3
1973	41984.15	7285.81	14404.14	8765.31	38,072,000	1102.7
1974	45557.27	7788.28	15744.05	10942.68	39,036,000	1167.0
1975	49632.85	8430.33	17111.89	13287.54	40,078,000	1238.4
1976	53931.76	9239.86	18814.70	13873.75	40,915,000	1318.1
1977	56276.62	9909.82	19875.47	15297.41	41,768,000	1347.3
1978	57867.77	10272.72	20685.01	11612.64	42,640,000	1357.1
1979	57337.39	9742.33	20433.77	11640.55	43,530,000	1317.1
1980	56918.66	9128.20	20294.20	12673.40	44,438,000	1280.8
1981	59403.10	9965.65	21215.39	13343.37	45,544,000	1304.3
1982	62390.00	10523.95	21941.18	13147.96	46,677,000	1336.6
1983	64679.03	11473.06	22862.38	13706.26	47,838,000	1352.0
1984	68419.64	12645.49	24509.36	14487.88	49,028,000	1395.5
1985	71909.01	13287.54	25653.88	15353.24	50,248,000	
1986	77642.66	14599.54	27496.27	16888.57	51,353,000	

Source: The World Bank Data Tape (1987)

APPENDIX A: MACROECONOMIC DATA

yugoslavia	defla 1980	4.232	ratio	0.1717602175		
macro data	exch 1980	24.639	constant million 1980 $			
year	cons. gdp	cons. mfg	cons.svcs	cons. gdi	population	gdp/ca
1960	22842.91	0.00	6849.28	7267.69	18,402,000	1241.3
1961	24047.63	0.00	6843.27	7839.82	18,612,000	1292.0
1962	24904.20	0.00	6957.49	8395.30	18,819,000	1323.3
1963	27436.46	0.00	7286.93	9652.92	19,029,000	1441.8
1964	30146.66	0.00	8239.51	11257.34	19,222,000	1568.3
1965	30556.14	0.00	8917.10	10208.74	19,434,000	1572.3
1966	32093.23	0.00	10004.35	10247.04	19,644,000	1633.7
1967	33150.24	0.00	10564.63	10580.77	19,840,000	1670.8
1968	35074.47	0.00	11642.25	10730.20	20,029,000	1751.1
1969	38994.90	0.00	13533.85	11062.05	20,209,000	1929.5
1970	40825.86	0.00	14399.35	12794.59	20,371,000	2004.1
1971	44423.38	0.00	16042.75	13999.66	20,572,000	2159.4
1972	46041.01	0.00	18239.22	12935.09	20,772,000	2216.4
1973	47261.02	0.00	19235.25	14403.47	20,956,000	2255.2
1974	54173.69	0.00	20494.14	15632.41	21,164,000	2559.7
1975	54666.30	0.00	21244.56	17213.64	21,365,000	2558.6
1976	57540.36	0.00	22471.46	17840.39	21,573,000	2667.2
1977	62401.17	0.00	25023.83	20943.24	21,775,000	2865.7
1978	67728.66	0.00	27738.91	20281.27	21,968,000	3083.0
1979	71443.83	0.00	28633.12	24892.69	22,166,000	3223.1
1980	73083.97	0.00	28821.36	23844.79	22,304,000	3276.7
1981	74140.64	0.00	27641.20	24136.78	22,471,000	3299.3
1982	74486.57	0.00	27407.26	23395.80	22,646,000	3289.1
1983	73734.26	0.00	26272.96	23248.26	22,800,000	3233.9
1984	75187.01	0.00	26639.32	23867.63	22,963,000	3274.2
1985	75534.48		28008.94	23454.72	23,123,000	
1986	78094.55			24345.98	23,273,000	

APPENDIX B: INTERNATIONAL STANDARD INDUSTIAL CLASSIFICATION

Overview of Major Divisions, Divisions, and Major Groups

Division	Major group	Title of category
		Major Division 1. Agriculture, Hunting, Forestry and Fishing
11		Agriculture and Hunting
	111	Agricultural and livestock production
	112	Agricultural services
	113	Hunting, trapping and game propagation
12		Forestry and Logging
	121	Forestry
	122	Logging
13	130	Fishing
		Major Division 2. Mining and Quarrying
21	210	Coal Mining
22	220	Crude Petroleum and Natural Gas Production
23	230	Metal Ore Mining
29	290	Other Mining
		Major Division 3. Manufacturing
31		Manufacture of Food, Beverages and Tobacco
	311-312	Food manufacturing
	313	Beverage industries
	314	Tobacco manufactures
32		Textile, Wearing Apparel and Leather Industries
	321	Manufacture of textiles
	322	Manufacture of wearing apparel, except footwear
	323	Manufacture of leather and products of leather, leather substitutes and fur, except footwear and wearing apparel
	324	Manufacture of footwear, except vulcanized or moulded rubber or plastic footwear
33		Manufacture of Wood and Wood Products, Including Furniture
	331	Manufacture of wood and wood and cork products, except furniture
	332	Manufacture of furniture and fixtures, except primarily of metal
34		Manufacture of Paper and Paper Products, Printing and Publishing
	341	Manufacture of paper and paper products
	342	Printing, publishing and allied industries
35		Manufacture of Chemicals and Chemical, Petroleum, Coal, Rubber and Plastic Products
	351	Manufacture of industrial chemicals
	352	Manufacture of other chemical products
	353	Petroleum refineries
	354	Manufacture of miscellaneous products of petroleum and coal
	355	Manufacture of rubber products
	356	Manufacture of plastic products not elsewhere classified
36		Manufacture of Non-Metallic Mineral Products, except Products of Petroleum and Coal
	361	Manufacture of pottery, china and earthenware
	362	Manufacture of glass and glass products
	369	Manufacture of other non-metallic mineral products
37		Basic Metal Industries
	371	Iron and steel basic industries
	372	Non-ferrous metal basic industries
38		Manufacture of Fabricated Metal Products, Machinery and Equipment
	381	Manufacture of fabricated metal products, except machinery and equipment
	382	Manufacture of machinery except electrical
	383	Manufacture of electrical machinery apparatus, appliances and supplies
	384	Manufacture of transport equipment
	385	Manufacture of professional and scientific and measuring and controlling equipment not elsewhere classified, and of photographic and optical goods
39	390	Other Manufacturing Industries
		Major Division 4. Electricity, Gas and Water
41	410	Electricity, Gas and Steam
42	420	Water Works and Supply
		Major Division 5. Construction
50	500	Construction
		Major Division 6. Wholesale and Retail Trade and Restaurants and Hotels
61	610	Wholesale Trade
62	620	Retail Trade
63		Restaurants and Hotels
	631	Restaurants, cafés and other eating and drinking places
	632	Hotels, rooming houses, camps and other lodging places
		Major Division 7. Transport, Storage and Communication
71		Transport and Storage
	711	Land transport
	712	Water transport
	713	Air transport
	719	Services allied to transport
72	720	Communication
		Major Division 8. Financing, Insurance, Real Estate and Business Services
81	810	Financial Institutions
82	820	Insurance
83		Real Estate and Business Services
	831	Real estate
	832	Business services except machinery and equipment rental and leasing
	833	Machinery and equipment rental and leasing
		Major Division 9. Community, Social and Personal Services
91	910	Public Administration and Defence
92	920	Sanitary and Similar Services
93		Social and Related Community Services
	931	Education services
	932	Research and scientific institutes
	933	Medical, dental, other health and veterinary services
	934	Welfare institutions
	935	Business, professional and labour associations
	939	Other social and related community services
94		Recreational and Cultural Services
	941	Motion picture and other entertainment services
	942	Libraries, museums, botanical and zoological gardens, and other cultural services not elsewhere classified
	949	Amusement and recreational services not elsewhere classified
95		Personal and Household Services
	951	Repair services not elsewhere classified
	952	Laundries, laundry services, and cleaning and dyeing plan
	953	Domestic services
	959	Miscellaneous personal services
96	960	International and Other Extra-Territorial Bodies
		Major Division 0. Activities not Adequately Defined
0	000	Activities not adequately defined.

APPENDIX B: INTERNATIONAL STANDARD INDUSTIAL CLASSIFICATION

Description of Division 38 by Major Group

Division	Major group	Group	
		3529	Manufacture of chemical products not elsewhere classified The manufacture of miscellaneous chemical products, not elsewhere classified, such as furniture, metal and other polishes; waxes and dressings; disinfectants and deodorants; wetting agents, emulsifiers and penetrants; explosives and ammunition; adhesives, glues, sizes and cements, except dental, from vegetable, animal or purchased synthetic plastic materials; candles; inks and carbon black; incense and camphor products; essential oils; bluing and laundry soure; boiler and heat insulating compounds; water-proofing compounds; metal, oil and water treating compounds; and prepared photo-chemical materials and sensitized film, paper and cloth.
353		3530	Petroleum refineries Petroleum refineries producing gasoline (motor spirit), fuel oils, illuminating oils, lubricating oils and greases, and other products from crude petroleum and its fractionation products.
354		3540	Manufacture of miscellaneous products of petroleum and coal The manufacture of asphalt paving and roofing materials; fuel briquettes and packaged fuel from purchased coal or lignite; and compounded and blended lubricating oils and greases from purchased materials. Included is the distillation of coal in coke ovens which are not part of gas or iron and steel works and which while part of iron and steel works can be reported separately. Coke ovens which are in gas works are classified in group 4102 (Gas manufactures and distribution); coke ovens located in iron and steel works which can not be reported separately are classified in group 3710 (Iron and steel basic industries). The manufacture of fuel briquettes and packaged fuels by coal and lignite mining units is included in group 2100 (Coal mining).
355			Manufacture of rubber products
	3551		Tyre and tube industries The manufacture of tyres and tubes from natural or synthetic rubber for automobiles, trucks, aircraft, tractors and other equipment. Establishments primarily engaged in repairing, rebuilding and retreading tyres are included.
	3559		Manufacture of rubber products not elsewhere classified The manufacture from natural or synthetic rubber, gutta percha, balata or gutta siak, of all kinds of rubber products except tyres and tubes, such as footwear made primarily of vulcanized or moulded rubber, industrial and mechanical rubber goods, and rubber specialties and sundries, e.g., gloves, mats, sponges and other vulcanized articles. Establishments primarily engaged in reclaiming rubber from scrap rubber tyres, tubes and miscellaneous waste rubber articles are included. Also included are the chipping, mixing, rolling, cutting and related processing of natural rubber, except on rubber plantations (classified in group 1110, Agricultural production) and in forests (classified in group 1210, Forestry).
356		3560	Manufacture of plastic products not elsewhere classified The moulding, extruding and fabricating of plastic articles not elsewhere classified, such as plastic dinnerware, tableware, and kitchenware; plastic mats; synthetic sausage casings; plastic containers and cups; laminated sheets, rods and tubes from purchased plastic raw materials; plastic components for insulation; plastic footwear; plastic furniture; and plastic industrial supplies, e.g., machinery parts, bottles, tubes and cabinets. The manufacture of plastic house furnishing such as curtains or table covers, is classified in group 3212 (Manufacture of made-up textile goods except wearing apparel); the assembly of plastic toys and dolls, athletic and sporting goods is included in group 3909 (Manufacturing industries, n.e.c.) and the manufacture of plastic luggage, hand bags, pocket books and similar goods is classified in group 3233 (Manufacture of products of leather and leather substitutes).
36			Manufacture of Non-Metallic Mineral Products, except Products of Petroleum and Coal
	361	3610	Manufacture of pottery, china and earthenware The manufacture of vitreous and semivitreous china table and kitchen articles for preparing, serving or storing food and drink; vitreous china plumbing fixtures and china and earthenware plumbing fittings and bathroom accessories; porcelain electrical supplies; art, ornamental, industrial and laboratory pottery, stoneware and coarse earthenware; and unglazed red earthenware florists' articles.
	362	3620	Manufacture of glass and glass products The manufacture of glass, glass fibres and other glass products, except the grinding of optical lenses which is classified in group 3852 (Manufacture of photographic and optical goods).
	369		Manufacture of other non-metallic mineral products
		3691	Manufacture of structural clay products The manufacture of structural clay products such as bricks, tile, pipe, crucibles, architectural terracotta; stove lining, chimney pipes and tops; and refractories.
		3692	Manufacture of cement, lime and plaster The manufacture of all types of cement, such as Portland, natural, masonry, puzzolana, Roman and Keene's; quick, hydrated and dolomitic lime; and plaster.
		3699	Manufacture of non-metallic mineral products not elsewhere classified The manufacture of miscellaneous non-metallic mineral products, such as concrete, gypsum and plaster products, including ready-mixed concrete; mineral wool; slate products; cut-stone products not produced in conjunction with quarrying and extraction; abrasives; asbestos products; graphite products; and all other non-metallic mineral products not elsewhere classified.
37			Basic Metal Industries
	371	3710	Iron and steel basic industries The manufacture of primary iron and steel products, consisting of all processes from smelting in blast furnaces to the semi-finished stage in rolling mills and foundries, that is, the production of billets, blooms, slabs or bars; hot and cold rolling and drawing into basic forms such as sheets, tin-plate, terne-plate and black-plate, strips, tubes and pipes, rails, rods; and wire rods and heavy gauge wires castings and forgings. Establishments primarily engaged in manufacturing ferrous wire and wire products from purchased rods are classified in group 3819 (Manufacture of fabricated metal products except machinery and equipment n.e.c.). The foundries included here are part of establishments primarily engaged in producing and rolling of iron and steel or are primarily engaged in manufacturing castings and forgings for sale to others. Foundries in establishments primarily engaged in the manufacture, e.g., stamping, pressing, machining assembling, of a given class of goods, are included in the group to which the parent establishment is classified. Also included are coke ovens which are associated with blast furnaces and which can not be separately reported. Coke ovens which can be separately reported are classified in group 3540 (Manufacture of miscellaneous products of petroleum and coal).
	372	3720	Non-ferrous metal basic industries The manufacture of primary non-ferrous metal products, consisting of all processes from smelting, alloying and refining, rolling and drawing and founding and casting; that is, the production of ingots, bars and billets; sheets, strips, circles, sections, rods, tubes, pipes and wire

APPENDIX B: INTERNATIONAL STANDARD INDUSTIAL CLASSIFICATION

Division	Major group	Group	
			rods; castings and extrusions. Included is the production of alumina from bauxite. Establishments the main activity of which is producing uninsulated non-ferrous wire and cable from purchased wire rods are classified in group 3819 (Manufacture of fabricated metal products except machinery and equipment n.e.c.); and establishments primarily engaged in manufacturing insulated wire and cable from purchased wire rods are classified in group 3839 (Manufacture of electrical apparatus and supplies n.e.c.). Founding and casting carried on as part of the fabrication, e.g., stamping, pressing, machining, assembling, of a given class of goods, are included in the group to which the manufacture of the class of products is classified.
3			Manufacture of Fabricated Metal Products, Machinery and Equipment
	381		Manufacture of fabricated metal products, except machinery and equipment
		3811	Manufacture of cutlery, hand tools and general hardware The manufacture of table, kitchen and other cutlery; hand and edge tools such as axes and hatchets, chisels and files, hammers, shovels, rakes, hoes and other hand agricultural and garden tools, hardware and plumbers', masons', mechanics' and machinists' precision hand tools; hardware such as fireplace equipment, brackets, locks and key sets, and other builders' and furniture hardware, casters, clamps, and marine and luggage vehicle hardware. Included are blacksmith shops. Excluded are the production of silverware and plated ware, classified in group 3901 (Manufacture of jewellery and related articles) and the manufacture of cutting dies and power-driven hand tools, which are classified in the appropriate group of major group 382 (Manufacture of machinery and equipment except electrical).
		3812	Manufacture of furniture and fixtures primarily of metal The manufacture, alteration and repair of furniture and fixtures consisting primarily of metal, for household, office, public building, professional use, and restaurants. The production of upholstered or padded furniture having metal frames is classified in group 3320 (Manufacture of furniture and fixtures, except primarily of metal).
		3813	Manufacture of structural metal products Manufacture of structural components, steel or other metal, of bridges, tanks, smoke stacks and buildings; metal doors and screens, window frames and sashes, metal staircases and other architectural metal work; metal sections for ships and barges; boiler shop products; and sheet metal components of buildings, stovepipes and light tanks. The assembly and installation at the site of pre-fabricated components into bridges, tanks, boilers, central air conditioning and other sheet-metal systems by the manufacturer of these components which can not be separately reported, is to be included in this group, along with the main manufacturing activity.
		3819	Manufacture of fabricated metal products except machinery and equipment not elsewhere classified The manufacture of fabricated metal products such as metal cans from tin-plate, terne-plate, or enamelled sheet metal; metal shipping containers, barrels, drums, kegs and pails; metal stampings; screw machine products; safes and vaults; fabricated wire and cable products from purchased wire rods, excluding insulated wire and cable; steel springs; bolts, nuts, washers, rivets and collapsible tubes, except in primary rolling or drawing mills; furnaces, stoves and other space heaters, non-electrical; enamelled iron and metal sanitary ware and plumbers' brass goods; valve and pipe fittings; small metal ware; and all other fabricated metal products not elsewhere classified. This group includes industries such as those engaged in

Division	Major group	Group	
			enamelling, japanning and lacquering, and galvanizing, plating and polishing metal products. The manufacture of specialized parts of automobiles, aircraft and ships is classified in the appropriate group of major group 384 (Manufacture of transport equipment). The manufacture of machinery parts except those mentioned in this group are classified as follows: general purpose parts for machinery (group 3829); specialized parts of machinery and equipment (appropriate group of major groups 382 through 385).
	382		Manufacture of machinery except electrical
		3821	Manufacture of engines and turbines The manufacture, re-building and repair of steam and gas engines and steam, gas and hydraulic turbines; and of petrol, diesel and other internal combustion engines. The manufacture of complete steam, gas and hydraulic turbine-generator sets, and of complete engine-generator sets, is classified in group 3831 (Manufacture of electrical industrial machinery and apparatus). The manufacture of turbines or engines by establishments primarily engaged in fabricating a given type of transport equipment and establishments primarily engaged in producing specialized turbines or engines for a given type of transport equipment, are classified in the appropriate group of major group 384 (Manufacture of transport equipment).
		3822	Manufacture of agricultural machinery and equipment The manufacture and repair of agricultural machinery and equipment for use in the preparation and maintenance of the soil, in planting and harvesting of the crop, in preparing crops for market on the farm, or in dairy farming and live-stock raising; for use in performing other farm operations and processes, such as planting, seeding, fertilizing, cultivating, harvesting; ploughs, harrows, stalk cutters, milking machines, farm tractors, etc.. Excluded is the manufacture of agricultural hand tools, such as rakes, hoes, clippers, hand lawn mowers, which is classified in group 3811 (Manufacture of cutlery, hand tools and general hardware).
		3823	Manufacture of metal and wood working machinery The manufacture, alteration and repair of wood-working and metal-working machinery, such as machinery for sawmills, planing mills, furniture makers and veneer workers; lathes, boring, drilling, milling, grinding, shearing and shaping machines; power saws and sanders; drop forges and other forging machines; rolling mills, presses and drawing machines; extruding, welding and non-electrical welding machines; and machine tool cutters, dies and jigs. The manufacture of attachments and accessories for wood-working and metal-working machines is included. Excluded is the manufacture of electric welding equipment (classified in group 3831), and hand tools for wood and metal working that are not power driven (classified in group 3811).
		3824	Manufacture of special industrial machinery and equipment except metal and wood working machinery The manufacture, alteration and repair of special industrial machinery and equipment except metal-working and wood-working machinery, such as food machinery, textile machinery, paper industry machinery, printing-trade machinery and equipment, chemical industry machinery and equipment, oil refining machinery and equipment, cement-making and clay-working machinery, heavy machinery and equipment used by construction and mining industries. The manufacture of material handling machinery, such as lifting and hoisting machines, cranes, conveyors, industrial trucks is classified in group 3829 (Machinery and equipment, except electrical, n.e.c.).

APPENDIX B: INTERNATIONAL STANDARD INDUSTIAL CLASSIFICATION

Division	Major Group	Group	
		3849	Manufacture of transport equipment not elsewhere classified The manufacture of transport equipment, not elsewhere classified, such as animal-drawn wagons, carts and sleighs; hand-drawn pushcarts, wheelbarrows and baby carriages.
	385		Manufacture of professional and scientific, and measuring and controlling equipment not elsewhere classified, and of photographic and optical goods
		3851	Manufacture of professional and scientific, and measuring and controlling equipment, not elsewhere classified The manufacture, renovation and repair of laboratory and scientific instruments and of measuring and controlling equipment not elsewhere classified; the fabrication and assembly of cyclotrons, betatron and other accelerators; and the production of surgical, medical and dental equipment, instruments and supplies and of orthopedic and prosthetic appliances. The manufacture of optical instruments for scientific and medical use is classified in group 3852; the fabrication and assembly of radar equipment, X-ray and electric therapeutic apparatus is classified in the appropriate group of major group 383; the production of non-laboratory weighing instruments is classified in group 3825; the manufacture of measuring and dispensing pumps is classified in group 3829; and the fabrication of electrical industrial control devices is included in group 3831.
		3852	Manufacture of photographic and optical goods The manufacture of optical instruments and lenses, ophthalmic goods, photographic and photocopying equipment and supplies. Included is the manufacture of optical instruments for scientific and medical use. The production of photo-chemical materials and sensitized film, plates and paper is classified in group 3529 (Manufacture of chemical products n.e.c.).
		3853	Manufacture of watches and clocks The manufacture of clocks and watches of all kinds; clock and watch parts and cases; and mechanisms for timing devices.
39	390		Other Manufacturing Industries
		3901	Manufacture of jewellery and related articles The manufacture of jewellery, using precious metals, precious and semi-precious stones and pearls; and of silverware and silver, gold and other precious metal plated ware. The cutting and polishing of precious and semi-precious stones and the striking of medals and coins are included.
		3902	Manufacture of musical instruments The manufacture of musical instruments, such as pianos, string instruments, wind instruments and percussion instruments. The manufacture of gramophones and speech-recording machines and the production of gramophone records, are classified in group 3832 (Manufacture of radio, television and communication equipment and apparatus).
		3903	Manufacture of sporting and athletic goods Manufacture of sporting and athletic goods such as football, basketball, boxing, cricket and baseball equipment; gymnasium and playground equipment; billiard and pool tables; bowling alley equipment; golf and tennis goods; and fishing tackle. The manufacture of firearms and ammunition are classified in groups 3829 (Manufacture of machinery and equipment except electrical not elsewhere classified) and 3529 (Manufacture of chemical products not elsewhere classified), respectively. The production of sporting and athletic goods made primarily of rubber is classified in group 3559 (Manufacture of rubber products n.e.c.); or by moulding or extruding plastic materials is classified in group 3560 (Manufacture of plastic products n.e.c.).
		3909	Manufacturing industries not elsewhere classified The manufacture of products not elsewhere classified, such as toys, except those made primarily of rubber and by moulding or extruding plastic materials; pens, pencils, and other office and artists' materials; costume jewellery and costume novelties; umbrellas and canes; feathers, plumes and artificial flowers; buttons; brooms and brushes; lamp shades; tobacco pipes and cigarette holders; identification plates, badges, emblems and tags; signs and advertising displays; metal and rubber stamps and stencils; hair nets, wigs and similar articles.
			Major Division 4. Electricity, Gas and Water
41	410		Electricity, Gas and Steam
		4101	Electric light and power The generation, transmission and distribution of electric energy for sale to household, industrial and commercial users. Included are electric power plants which sell a significant amount of electricity to others, as well as produce electricity for their parent enterprise, and which can be reported separately from the other units of the parent enterprise.
		4102	Gas manufacture and distribution The manufacture of gas in gasworks and the distribution of manufactured or natural gas through a system of mains to household, industrial and commercial users. Coking ovens located in gas works are included.
		4103	Steam and hot water supply Establishments primarily engaged in the production and distribution of steam and hot water for heating, power and other purposes.
42	420	4200	Water Works and Supply The collection, purification and distribution of water to household, industrial and commercial users. The operation of irrigation systems is classified in group 1120 (Agricultural services).
			Major Division 5. Construction
50	500	5000	Construction General and special trade contractors primarily engaged in contract construction. Also included are units of enterprises primarily engaged in construction work for the parent enterprise which can be seperately reported. General contractors may be engaged in constructing, altering, repairing and demolishing buildings; constructing, altering and repairing highways and streets and bridges; viaducts, culverts, sewers, and water, gas and electricity mains; railway road-beds, subways, harbours and water ways; piers, airports and parking areas; dams, drainage, irrigation, flood-control and water-power projects and hydroelectric plants; pipe lines; water wells; athletic fields, golf courses, swimming pools and tennis courts; communication systems such as telephone and telegraph lines; marine construction, such as dredging and under-water rock removal; pile driving, land draining and reclamation; and other types of heavy construction. Businesses primarily engaged in performing mining services such as preparing and constructing mining sites and drilling crude oil and natural gas wells, on a contract or fee basis, are classified in this group. Special trade contractors are engaged in only part of the work of a construction project. Special trade contractors may work on subcontract from the general contractor or

APPENDIX B: INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION

Division	Major Group	Group	
		3825	Manufacture of office, computing and accounting machinery

The manufacture, renovation and repair of office machines and equipment, such as calculating machines, adding machines, accounting machines; punched-card system machines and equipment; digital and analog computers and associated electronic data processing equipment and accessories; cash registers; typewriters; weighing machines except when scientific apparatus for laboratories; duplicating machines except photo-copying machines; and other office machines.

		3829	Machinery and equipment except electrical not elsewhere classified

The manufacture, renovation and repair of machinery and equipment, except electrical machinery, not elsewhere classified, such as pumps, air and gas compressors; blowers, air conditioning and ventilating machinery; fire sprinklers; refrigerators and equipment; mechanical power transmission equipment; lifting and hoisting machinery, cranes, elevators, moving stairways, industrial trucks, tractors, trailors, and stackers; sewing machines; small arms and accessories, heavy ordinance and artillery; industrial process furnaces and ovens; automatic merchandising machines; washing, laundry, dry-cleaning and pressing machines; cooking ranges and ovens; and other service industry machines. Included are manufacture of general purpose parts of machinery, such as ball and roller bearings, piston rings, valves; and shops engaged in manufacturing, rebuilding or repairing various kinds of machinery and equipment and associated parts and accessories on a job or order basis for others.

383			Manufacture of electrical machinery, apparatus, appliances and supplies
	3831		Manufacture of electrical industrial machinery and apparatus

The manufacture, renovation and repair of electric motors; generators and complete turbine-generator and engine-generator sets; transformers; switch gear and switchboard apparatus; rectifiers; other electrical transmission and distribution equipment; electrical industrial control devices such as motor starters and controllers, electronic timing and positioning devices, electromagnetic clutches and brakes; electrical welding apparatus; and other electrical industrial apparatus.

		3832	Manufacture of radio, television and communication equipment and apparatus

The manufacture of radio and television receiving sets, sound reproducing and recording equipment, including public address systems, gramophones, dictating machines and tape recorders; gramophone records and pre-recorded magnetic tapes; wire and wireless telephone and telegraph equipment; radio and television transmitting, signalling, and detection equipment and apparatus; radar equipment and installations; parts and supplies specially used for electronic apparatus classified in this group; semi-conductor and related sensitive semi-conductor devices; fixed and variable electronic capacitors and condensers; radiographic, fluoroscopic and other X-ray apparatus and tubes.

		3833	Manufacture of electrical appliances and housewares

The manufacture of electrical appliances and housewares, such as electric space heaters; blankets; and heating pads; hot plates, broilers, roasters, toasters and food mixers; ironers and mangles; fans, vacuum cleaners and floor waxers and polishers; hair driers, toothbrushes, electric hair clippers, shavers and hot water heaters. Excluded is the manufacture of electric lighting equipment, which is classified in group 3839.

		3839	Manufacture of electrical apparatus and supplies not elsewhere classified

The manufacture of other electrical apparatus, accessories and supplies not elsewhere classified, such as insulated wires and cables; storage and primary batteries, wet and dry; electric lamps and tubes; fixtures and lamp sockets and receptacles; snap switches, conductor connectors, and other current-carrying wiring devices; conduits and fittings; electrical insulators and insulation materials except porcelain and glass insulators, which are classified in group 3610 (Manufacture of pottery, china and earthenware) and 3620 (Manufacture of glass and glass products), respectively.

384			Manufacture of transport equipment
	3841		Ship building and repairing

Shipyards and boatyards engaged in building, repair and specialized painting and caulking of all types of ships, barges, lighters, and boats, except rubber boats; specialized marine engine and ship parts manufactures; the conversion and alteration and breaking-up of ships. The fabrication of floating oil rigs is classified in group 3829 (Manufacture of special industrial machinery and equipment except metal and wood working machinery).

		3842	Manufacture of railroad equipment

The building and re-building of locomotives of any type or gauge, and railroad and tramway cars for freight and passenger service; the production of specialized parts for locomotive, railroad and tramway cars. Included are the separately reported establishments of railway and tramway companies primarily engaged in the re-building, repair and alteration of locomotives and cars. The manufacture of electrical signalling equipment for railways and tramways is classified in group 3832 (Manufacture of radio, television and communication equipment and apparatus).

		3843	Manufacture of motor vehicles

The manufacture, assembly, re-building and major alteration of complete motor vehicles such as passenger automobiles, commercial cars and buses, lorries and truck trailers, universal carriers, special purpose motor vehicles (ambulances, taxi-cabs, etc.); trailer and pick-up coaches; vehicle-drawn caravans; motorized sleighs; specialized manufacture of motor vehicle parts and accessories such as engines, brakes, clutches, axles, gears, transmissions, wheels and frames. This group does not include the manufacture of tyres and tubes (group 3551); automobile glass (group 3620); electrical equipment (appropriate group of major group 383) or agricultural, road building and industrial tractors, and fork-lift and industrial trucks (appropriate group of major group 382).

		3844	Manufacture of motorcycles and bicycles

The manufacture, assembly, re-building and major alteration of motorcycles, scooters, bicycles, tricycles, pedicabs, and specialized parts such as motors, saddles, seat posts, frames, gears and handle bars.

		3845	Manufacture of aircraft

The manufacture, assembly, re-building, alteration and repair of aeroplanes; gliders, aircraft parts such as engines, propellers, pontoons and under-carriages; space vehicles and specialized parts; and hovercraft and specialized parts. The manufacture of aeronautical electrical equipment is classified in the appropriate group of major group 383 (Manufacture of electrical machinery, apparatus, appliances and supplies); the production of aeronautical measuring instruments is classified in group 3851 (Manufacture of professional and scientific equipment and measuring and controlling instruments); the fabrication and assembly of missiles and rockets is classified in group 3829 (Manufacture of machinery and equipment except electrical not elsewhere classified).

APPENDIX C: VALUE OF PRODUCTION FOR ISIC DIVISION 38

TOTAL TRADE AND PRODUCTION
In national currencies

COMMERCE TOTAL ET PRODUCTION
en monnaies locales

Product : 3----

Produit : 3----

	1970	1978	1979	1980	1981	1982	1983	1984	1985	85/70
GREECE (1)										
Production	132857	644390	841926	1077843	1368511	1544274	1838514	2246670	2749788	22.4
Import	53832	224337	262549	329287	368705	446539	585020	762922	963263	21.2
Export	10446	92992	109185	175085	194848	227688	315195	434543	504445	29.5
M Pénétration	30.5	28.9	26.4	25.7	23.9	25.3	27.7	29.6	30.0	-0.0
X Performance	5.6	10.7	9.9	12.4	11.2	11.4	13.0	14.4	13.6	0.5
IRELAND (2)										
Production	1117000	5738000	6898000	7730000	8999000	10072000	11826000	14462910	17489690	20.1
Import	520633	3233204	4255201	4660491	5787472	6019784	6416054	7773169	8131931	20.1
Export	293659	2506674	3059939	3601736	4239369	5066202	6164098	7895696	8685052	25.3
M Pénétration	38.8	50.0	52.6	53.0	54.9	54.6	53.1	54.2	48.0	0.6
X Performance	18.1	27.9	27.4	29.1	28.7	31.5	33.8	35.5	33.9	1.1
ITALY (3)										
Production	41641	131622	166200	202442	233126	260754	314034	379277	408920	16.5
Import	6583	31051	43035	57141	62781	77006	78871	100023	119372	21.3
Export	7882	47147	59315	65845	84267	97356	108121	126538	146574	21.5
M Pénétration	16.3	26.9	28.7	29.5	29.7	32.0	27.7	28.4	31.3	1.0
X Performance	16.3	29.0	28.3	25.4	28.5	28.8	27.5	26.4	27.7	0.8
NETHERLANDS (2)										
Production	71647003	152124600	173193685	188285274	212344325	215772008	223854180	244969012	257772960	8.9
Import	38011103	86860268	101241038	110721209	117127824	120101951	129149016	142455857	160820790	10.1
Export	36319994	90117141	107524162	121328631	139294664	145208579	154354193	173613749	186239903	11.5
M Pénétration	51.8	58.3	60.7	62.3	61.6	63.0	65.0	66.6	69.2	1.2
X Performance	33.1	37.7	39.2	40.6	42.3	43.2	43.7	44.8	44.5	0.8
NORWAY (2)										
Production	48508007	105787018	122145298	142027037	157644684	164436157	174165125	196820072	223027425	10.7
Import	23237969	51937793	59298467	70623349	78084581	88687469	89276965	102480883	122137878	11.7
Export	15866089	39989430	42587793	46669414	51812672	55120610	61632757	69291468	78060278	11.2
M Pénétration	41.6	44.1	42.7	42.5	42.5	44.8	44.2	44.6	45.7	0.3
X Performance	22.1	25.4	23.5	21.9	22.0	21.8	23.4	23.2	22.6	0.0
PORTUGAL (1)										
Production	85733	469110	654360	897720	1095410	1359300	1768200	2218200	2787793	26.1
Import	36114	155944	210072	293975	367213	473653	562680	682704	809069	23.0
Export	25044	102451	163533	222746	246045	322475	488104	739724	944221	27.4
M Pénétration	37.3	29.8	30.0	30.3	30.2	31.4	30.5	31.6	30.5	-0.5
X Performance	20.6	16.4	18.9	18.7	16.8	17.6	20.9	25.5	26.3	0.4
SPAIN (1)										
Production	1468000	7620000	8722000	10624000	11712000	12875000	15001000	16627740	18543210	18.4
Import	237390	803574	979661	1227440	1503878	1639903	2160791	2496133	2888949	18.1
Export	135922	897237	1079825	1342995	1684382	1866751	2578959	3392368	3739104	24.7
M Pénétration	15.1	10.7	11.4	11.7	13.0	13.0	14.8	15.9	16.3	0.1
X Performance	8.0	10.7	11.1	11.3	12.7	12.9	15.0	17.7	17.4	0.6
SWEDEN (2)										
Production	1115367816	251069538	295816517	319872359	341445303	377241370	439090336	500955666	538958006	10.8
Import	32641032	80078545	105389693	113859021	118275221	143693550	165359777	182118730	205081430	13.0
Export	32889744	94590963	113256773	125400481	138274868	161872885	202961834	233144497	249210733	14.5
M Pénétration	28.3	33.9	36.6	37.3	36.8	40.0	41.2	40.5	41.4	0.9
X Performance	22.2	28.6	28.2	28.8	30.1	31.1	33.6	34.1	33.5	0.8
TURKEY (1)										
Production	63906	606900	969000	2236500	3750000	5393100	6893800	10750300	14919902	43.8
Import	6802	78861	117817	340951	569770	781577	1241242	2438893	3790917	52.4
Export	1028	13466	25085	81414	283227	376068	849022	1917716	3181187	70.9
M Pénétration	9.8	11.8	11.1	13.7	14.1	14.0	17.0	21.6	24.4	1.0
X Performance	1.5	2.3	2.3	3.2	6.6	9.3	10.4	14.5	17.0	1.0
YUGOSLAVIA (2)										
Production	123700	987500	1285300	1789500	2621200	3400800	5002100	8367700	15404800	37.9
Import	31711	142958	203006	279686	299068	375913	511605	1006595	1501257	29.3
Export	18481	95237	117289	224665	274317	396230	572335	1226300	1830863	35.9
M Pénétration	23.2	13.8	14.8	15.2	11.3	11.1	10.4	12.4	10.0	-0.9
X Performance	11.9	8.4	7.9	10.9	9.4	10.5	10.4	13.1	10.8	-0.1

Notes
1) Thousands. 2) Million.

Source: OECD Compatible Trade and Poduction Data Base

APPENDIX C: VALUE OF PRODUCTION FOR ISIC DIVISION 38

TOTAL TRADE AND PRODUCTION
in national currencies

COMMERCE TOTAL ET PRODUCTION
en monnaies locales

Product : 381--

Produit : 381--

	1970	1978	1979	1980	1981	1982	1983	1984	1985	85/70
GERMANY (1)										
Production	34730481	53367012	60307249	65384356	66507435	67471665	67333581	71544479	77869090	5.5
Import	1978906	5208325	5988543	7147785	7122457	7148037	7716731	8360844	8717776	10.4
Export	5590198	13106624	13474203	14696651	15770843	17051563	17009046	18355012	20000309	8.9
M Pénétration	6.4	11.5	11.3	12.4	12.3	12.4	13.3	13.6	13.1	0.4
X Performance	15.2	22.4	20.3	20.3	21.4	22.9	22.7	23.0	23.1	0.5
GREECE (1)										
Production	8393000	35442000	46306000	62294000	80939000	88506960	105370700	128763400	157598600	21.6
Import	1818348	5284112	6948173	8572835	11373765	13245166	16146689	20775425	21792883	18.0
Export	95101	2006965	2230642	4583082	6208319	5104064	7813651	8399264	9438558	35.9
M Pénétration	18.0	13.6	13.6	12.9	13.2	13.7	14.2	14.7	12.8	-0.3
X Performance	0.9	4.9	4.2	6.5	6.7	5.0	6.4	5.6	5.3	0.3
IRELAND (1)										
Production	38000	205000	298000	351000	384000	407000	413000	568890	687950	21.3
Import	28134	148622	194929	233071	263763	276111	251595	273902	278015	16.5
Export	5700	70426	90089	112139	121765	130415	174672	209373	235573	28.2
M Pénétration	46.6	52.5	48.4	49.4	50.1	51.8	51.4	43.2	38.1	-0.6
X Performance	8.6	19.9	18.3	19.2	18.8	22.0	26.3	24.8	24.4	1.1
ITALY (2)										
Production	2093	5801	7207	9101	10640	10622	13723	16016	16760	14.9
Import	158	647	815	1135	1275	1468	1434	1717	2047	18.6
Export	325	2537	3031	3665	4792	5284	5922	6256	6733	22.4
M Pénétration	8.2	16.5	16.3	17.3	17.9	21.6	15.5	15.0	17.0	0.6
X Performance	14.5	39.3	37.8	35.8	40.2	43.7	39.1	35.3	35.8	1.4
NETHERLANDS (1)										
Production	3774539	7114098	7575499	8182296	8470408	8060911	8236108	8772385	9739098	6.5
Import	1715055	3727166	4032342	4444889	4348540	4369336	4495991	5260555	5779824	8.4
Export	1099072	2943743	2977624	3378460	3735584	4442722	4143315	4405135	4881660	10.5
M Pénétration	39.1	47.2	46.7	46.1	47.9	54.7	52.3	54.6	54.3	1.0
X Performance	20.0	27.2	25.7	26.8	29.1	35.7	32.5	31.4	31.5	0.8
NORWAY (1)										
Production	2518500	5150515	5182169	6174932	6684597	7087904	7909430	7719964	9070394	8.9
Import	891908	3260232	2686454	3518579	3581870	4858365	4830807	4849874	6156101	13.7
Export	400925	851742	936071	1180563	1235687	1429162	1397545	1625752	1703107	10.1
M Pénétration	29.6	43.1	38.8	41.3	39.7	46.2	42.6	44.3	45.5	1.1
X Performance	11.8	10.1	11.9	12.2	12.0	12.0	11.0	12.9	11.2	-0.0
PORTUGAL (1)										
Production	2810000	20240000	27490000	39750000	46070000	55300000	64400000	72400000	101980300	27.1
Import	1044188	3910663	4848446	6717314	8404409	10629856	11296962	12894203	16013449	20.0
Export	728776	2461651	4173196	5474768	7568539	7882526	10437330	17171241	22921048	25.8
M Pénétration	37.4	18.0	17.2	16.4	17.9	18.3	17.3	18.9	16.8	-1.1
X Performance	18.9	10.2	12.9	11.8	13.9	12.0	13.8	20.1	19.4	0.0
SPAIN (2)										
Production	92000	468000	534000	636000	695000	753000	707000	914280	1019610	17.4
Import	7687	26338	28680	37388	39474	48780	53623	62144	74531	16.4
Export	5929	42643	52747	61469	73410	89153	106435	115101	126061	22.6
M Pénétration	8.2	5.8	5.6	6.1	6.0	6.8	8.2	7.2	7.7	-0.0
X Performance	5.9	8.6	9.4	9.1	10.0	11.1	14.0	11.8	11.5	0.4
SWEDEN (1)										
Production	7962995	16863984	19280859	22630764	23193778	25118358	28026482	33157131	35726000	10.5
Import	1148197	3224519	3957188	4693305	4648238	5280840	5997499	6977009	7697423	13.5
Export	1304422	4942993	5812889	6372961	6990736	7582941	9252290	10794114	11776397	15.8
M Pénétration	14.7	21.3	22.7	22.4	22.3	23.1	24.2	23.8	24.3	0.6
X Performance	14.3	24.6	25.0	23.3	25.1	24.9	27.2	26.9	27.1	0.9
TURKEY (3)										
Production	3340	24700	38300	69300	102100	139100	184300	276500	389144	37.3
Import	256	4193	4498	16974	23345	34691	36301	64471	58933	43.7
Export	5	254	265	1213	6802	14463	17572	25000	110793	93.1
M Pénétration	7.1	14.6	10.6	20.0	19.7	21.8	17.9	20.4	17.5	0.7
X Performance	0.1	0.9	0.6	1.4	5.4	8.3	8.0	7.3	24.7	1.6
YUGOSLAVIA (2)										
Production	7200	85700	94000	131200	193900	258600	348300	555900	1082200	39.7
Import	1199	6009	7405	10182	10605	12715	18113	26650	45123	27.4
Export	807	4722	7657	12400	16558	24660	36863	63028	91864	37.1
M Pénétration	15.8	6.9	7.9	7.9	5.6	5.2	5.5	5.1	4.4	-0.8
X Performance	9.6	5.1	7.6	8.8	8.1	9.1	10.1	10.8	8.1	-0.1

Notes :
1) Thousands. 2) Billion. 3) Million.

APPENDIX C: VALUE OF PRODUCTION FOR ISIC DIVISION 38

TOTAL TRADE AND PRODUCTION
in national currencies

COMMERCE TOTAL ET PRODUCTION
en monnaies locales

Product : 382--

Produit : 382--

	1970	1978	1979	1980	1981	1982	1983	1984	1985	85/70
GERMANY (1)										
Production	54840175	90611748	97328193	106927840	110526266	113944880	115186715	118160059	133094845	6.1
Import	8533020	16455656	19292293	22459965	24058694	24467928	27906032	32412971	38230626	10.5
Export	26760124	55331501	57803690	62400690	68894516	73319540	72616449	80856703	94068421	8.7
M Pénétration	23.3	31.8	32.8	33.5	36.6	37.6	39.6	46.5	49.5	1.7
X Performance	42.2	51.7	49.6	48.2	51.2	53.0	50.7	53.7	54.9	0.8
GREECE (1)										
Production	2896000	12888000	16838000	17950000	21264000	26865770	31984670	39085370	47838130	20.6
Import	7576306	26395126	37882353	40818010	45752245	56925055	71458961	86984145	105216986	19.2
Export	34331	1197727	1088325	2033586	4050330	4167955	6906381	8535364	5728153	36.4
M Pénétration	72.7	69.3	70.6	71.9	72.7	71.5	74.0	74.0	71.4	-0.1
X Performance	0.5	3.0	2.0	3.5	6.0	5.0	6.7	6.8	3.7	0.2
IRELAND (1)										
Production	13000	268000	364000	492000	728000	912000	1353000	1378100	1666300	38.2
Import	86291	526159	637217	694322	858860	925472	1107775	1536919	1646211	21.7
Export	8953	268953	327693	436735	667280	890213	1257919	1891969	2270344	44.6
M Pénétration	95.5	96.5	94.8	92.6	93.4	97.7	92.1	149.2	157.9	4.2
X Performance	9.0	31.4	32.1	36.8	42.1	48.4	51.1	64.4	68.5	4.0
ITALY (2)										
Production	4770	12775	15992	20695	23499	26113	31638	38207	43716	15.9
Import	822	3468	4084	6098	6610	7962	8098	10846	13444	20.5
Export	1723	8988	10186	13223	15089	17476	19707	22835	27350	20.2
M Pénétration	21.2	47.8	41.3	44.9	44.0	48.0	40.4	41.4	45.1	1.6
X Performance	30.8	55.3	50.7	49.4	50.1	51.3	49.6	46.6	47.8	1.1
NETHERLANDS (1)										
Production	2952275	8114198	8416198	9183295	11021694	9246600	9763714	11406391	11898903	9.7
Import	4212414	8441503	9292036	10312928	10663779	12442895	14077656	16880799	20294802	11.1
Export	2650905	6612522	7318794	8362476	9932821	10992587	12099506	14173490	16239695	12.8
M Pénétration	93.3	84.9	89.4	92.6	90.7	116.3	119.8	119.6	127.2	2.3
X Performance	37.0	39.9	41.3	42.9	45.8	50.7	50.7	50.1	50.4	0.9
NORWAY (1)										
Production	1976307	5681712	6958703	11492623	14466306	14806689	14228020	18299893	29734570	19.8
Import	2719298	7529842	7998467	10419497	11303512	12427525	12491436	16050327	20315678	14.3
Export	940117	2842956	3045127	4148713	4950583	5352560	5528612	6276872	7122725	14.5
M Pénétration	72.4	72.6	67.1	58.7	54.3	57.3	58.9	57.2	47.3	-1.7
X Performance	20.0	21.5	20.4	18.9	19.2	20.4	20.7	18.3	14.2	-0.4
PORTUGAL (1)										
Production	907000	10380000	13720000	20270000	26850000	33800000	40800000	48400000	64825060	32.9
Import	6318294	29783909	37789979	54626651	72098469	90634266	90746379	94707826	113672625	21.2
Export	674439	3432066	4022941	9356001	12389993	19363657	31006425	39151241	52835460	33.7
M Pénétration	96.5	85.8	86.9	83.3	83.5	86.4	90.3	91.1	90.5	-0.4
X Performance	9.3	13.5	15.6	12.5	12.7	15.7	25.6	27.4	29.6	1.4
SPAIN (2)										
Production	34000	345000	380000	448000	480000	503000	653000	684960	763870	23.1
Import	47748	136377	147699	191797	222685	264084	333940	425990	513213	17.2
Export	12795	90407	112185	136354	179050	187087	181285	271016	336671	24.4
M Pénétration	69.2	34.9	35.5	38.1	42.5	45.5	41.4	50.7	54.6	-1.0
X Performance	15.7	18.8	21.3	21.3	25.5	24.4	18.4	24.4	26.4	0.7
SWEDEN (1)										
Production	13631860	28978918	33087748	35845451	37766691	39787404	46780468	53730556	60798006	10.5
Import	4435894	11014140	13229745	16503588	17203360	20562318	25401200	27578810	33128793	14.3
Export	6289787	16905408	20187419	23632941	25404062	28030060	33845702	38398235	43267570	13.7
M Pénétration	37.7	47.7	50.6	57.5	58.2	63.6	66.3	64.3	65.4	1.8
X Performance	34.8	42.3	43.6	45.1	46.2	46.4	46.9	47.2	46.1	0.8
TURKEY (3)										
Production	2570	34000	50300	98300	167100	235700	309200	550200	694948	45.3
Import	1578	16615	23266	48635	116239	184236	270595	504476	736974	50.6
Export	17	257	400	1473	7652	18852	33442	44984	186838	86.2
M Pénétration	38.2	33.0	31.8	33.4	42.2	45.9	49.5	50.0	59.2	1.6
X Performance	0.4	0.3	0.3	1.0	2.7	4.3	5.8	4.3	13.0	0.8
YUGOSLAVIA (2)										
Production	6000	63600	82000	106300	153200	206700	290500	475600	934100	40.0
Import	5577	35722	53278	63433	61919	78920	94311	174256	274196	29.7
Export	887	11298	12665	21396	28458	45192	70771	143966	201583	43.6
M Pénétration	52.2	40.6	43.5	42.7	33.2	32.8	30.0	34.4	27.2	-1.7
X Performance	7.7	11.4	9.4	12.6	13.2	15.8	18.4	22.2	16.7	0.6

Notes :
1) Thousands. 2) Billion. 3) Million.

APPENDIX C: VALUE OF PRODUCTION FOR ISIC DIVISION 38

TOTAL TRADE AND PRODUCTION
in national currencies

COMMERCE TOTAL ET PRODUCTION
en monnaies locales

Product : 383--

Produit : 383--

	1970	1978	1979	1980	1981	1982	1983	1984	1985	85/70
GERMANY (1)										
Production	33,93516	53737826	55949284	60691244	60141731	58592159	58563329	64359599	71911887	5.3
Import	5044418	13559578	15139122	18161701	20020502	21116786	23122768	27823411	30384981	12.7
Export	9779575	25133979	25597589	27366068	29524668	32477097	32789658	37723218	42158561	10.2
M Pénétration	17.7	32.2	33.3	35.3	39.5	44.7	47.3	51.1	50.5	2.2
X Performance	25.6	37.3	36.0	34.7	36.8	40.7	40.1	40.9	41.2	1.0
GREECE (1)										
Production	7078000	23198000	30309000	41677000	51189000	57689710	68681690	83929250	102724300	19.5
Import	3343023	12200953	14597649	21869055	23405478	28567803	36226432	43831031	59217403	21.1
Export	161282	2433028	3220255	4044809	6094334	6037908	6559313	7106203	10310402	31.9
M Pénétration	32.6	37.0	35.0	36.8	34.2	35.6	36.8	36.3	39.1	0.4
X Performance	1.5	6.9	7.2	6.4	6.2	7.0	6.2	5.6	6.4	0.3
IRELAND (1)										
Production	44000	203000	261000	350000	448000	583000	730000	816650	987550	23.0
Import	34868	217275	284333	362097	475527	519400	570965	748614	776355	23.0
Export	10826	118730	149446	222974	287751	373842	441172	586259	651687	31.4
M Pénétration	51.2	72.1	71.8	74.0	74.8	71.3	66.4	76.5	69.8	1.2
X Performance	13.7	28.3	27.4	31.3	31.2	33.9	33.9	37.4	36.9	1.5
ITALY (2)										
Production	2720	9890	11721	14152	15517	17905	22693	24983	27531	16.7
Import	430	2330	2988	3961	4286	5356	5394	7111	8617	22.1
Export	494	2669	3116	3501	4654	5625	6326	7347	8323	20.7
M Pénétration	16.2	24.4	25.8	27.1	28.1	30.4	24.9	28.7	31.0	1.0
X Performance	15.7	21.8	21.2	19.3	23.5	24.2	22.6	22.9	23.0	0.5
NETHERLANDS (1)										
Production	6950560	12694512	13845713	15547097	14557169	19118721	18835916	21130644	23437279	8.4
Import	3915299	8021827	8440377	9515228	9405643	9285328	10077460	12207706	13794328	8.8
Export	3463824	7826628	8373120	8882949	9087287	9244100	9213049	10399625	11823287	8.5
M Pénétration	52.9	62.2	60.7	58.8	63.2	48.5	51.2	53.2	54.3	0.1
X Performance	31.9	37.8	37.6	35.4	37.9	32.5	31.9	31.2	31.8	-0.0
NORWAY (1)										
Production	2526957	4903375	4917886	5285290	6051093	6910508	7410057	8050977	8823852	8.7
Import	1503670	4615625	4901179	5881253	6446912	6689923	7247546	9031597	11109227	14.3
Export	541105	1357511	1584211	1757194	1969804	2261282	2646003	2598378	2684848	11.3
M Pénétration	43.1	56.8	59.5	62.5	61.2	59.0	60.3	62.4	64.4	1.4
X Performance	13.4	14.6	16.1	15.7	15.8	16.6	18.1	15.2	13.5	0.0
PORTUGAL (1)										
Production	3120000	20520000	28830000	40560000	48970000	62500000	87200000	113100000	135935100	28.6
Import	2817900	12419927	16625821	24103973	29995040	41350365	49958946	62788841	72168199	24.1
Export	1306472	7287367	9737402	13719769	14556122	20008351	30896439	52099416	64035052	29.6
M Pénétration	60.8	48.4	46.5	47.3	46.6	49.3	47.0	50.7	50.1	-0.7
X Performance	22.9	22.1	21.4	21.2	18.4	19.3	22.5	29.6	30.8	0.6
SPAIN (2)										
Production	67000	451000	491000	535000	561000	658000	752000	826600	921820	19.1
Import	14956	72341	82612	114505	134505	165800	220542	225563	243531	20.4
Export	5157	33226	42657	56252	64940	72351	98330	117889	129403	24.0
M Pénétration	19.5	14.8	15.6	19.3	21.3	22.1	25.2	24.1	23.5	0.3
X Performance	6.3	6.3	7.4	8.7	9.3	8.8	10.1	11.2	11.1	0.3
SWEDEN (1)										
Production	6076626	16028467	18827480	18523167	21187419	23420658	27210793	30151472	33752999	12.1
Import	2918232	7538264	8685209	10291936	10851618	13505972	15806580	19424035	22489033	14.6
Export	2322658	8218533	9394210	10133882	11340390	14343688	16179727	18588451	21608657	16.0
M Pénétration	43.7	49.1	47.9	53.0	52.4	59.8	58.9	62.7	64.9	1.4
X Performance	25.6	34.9	34.1	35.1	35.4	38.8	37.6	37.5	38.4	0.8
TURKEY (3)										
Production	1010	27000	43200	85490	118600	166000	258000	453700	549095	52.1
Import	637	5430	7944	21712	40820	66835	106983	236047	394772	53.5
Export	7	165	218	1065	4054	13503	16174	38236	68478	84.1
M Pénétration	38.6	16.8	15.6	20.5	26.3	30.5	30.7	36.2	45.1	0.4
X Performance	0.4	0.5	0.4	1.0	2.5	5.8	4.4	5.5	7.3	0.5
YUGOSLAVIA (2)										
Production	10200	68400	88400	119100	168900	220900	316200	544300	1144200	37.0
Import	1886	11881	16388	21891	21921	26644	37435	74408	110658	31.2
Export	1379	8018	10229	19622	25056	38205	55943	109869	163595	37.5
M Pénétration	17.6	16.4	17.3	18.0	13.2	12.7	12.6	14.6	10.1	-0.5
X Performance	11.4	10.0	9.8	13.9	13.1	15.4	15.8	17.8	13.0	0.1

Notes :
1) Thousands. 2) Billion. 3) Million.

APPENDIX C: VALUE OF PRODUCTION FOR ISIC DIVISION 38

TOTAL TRADE AND PRODUCTION
in national currencies

COMMERCE TOTAL ET PRODUCTION
en monnaies locales

Product : 384--

Produit : 384--

	1970	1978	1979	1980	1981	1982	1983	1984	1985	85/70
GERMANY (1)										
Production	47362421	96771270	105744289	111507667	122587415	130550942	136443444	139147307	157982969	8.4
Import	7238763	20186108	22035967	23290959	28888817	31472646	34740633	36333947	38284424	11.7
Export	21499656	51382648	56918968	61893300	75235024	89931611	87690444	98015115	106976172	11.3
M Pénétration	21.9	30.9	31.1	31.9	37.9	43.7	41.6	46.9	42.9	1.4
X Performance	39.4	44.1	44.5	45.9	49.7	55.5	51.2	55.9	54.5	1.0
GREECE (1)										
Production	4355000	23198000	30309000	41266000	57480000	59859750	72265200	87086310	126589400	23.8
Import	16653867	80260106	83186100	101062570	70476313	88091157	106117993	148528992	173469141	16.9
Export	92161	676906	812097	1599467	3274437	4741239	4382365	3108768	4891817	30.3
M Pénétration	79.6	78.1	73.8	71.8	56.5	61.5	61.3	63.9	63.0	-1.1
X Performance	0.4	0.7	0.7	1.1	2.6	3.2	2.5	1.3	1.7	0.1
IRELAND (1)										
Production	72000	269000	256000	270000	313000	324000	344000	464070	561190	14.7
Import	56195	369622	455993	426662	478070	412739	438443	486398	551779	16.4
Export	4943	52780	102463	117237	114900	166359	190003	168908	130136	24.4
M Penetration	45.6	65.3	74.8	73.7	70.5	72.4	74.0	62.2	56.1	0.7
X Performance	3.9	8.5	14.4	16.8	14.5	22.6	24.3	17.8	11.7	0.5
ITALY (2)										
Production	3125	13744	16286	20108	22352	24750	27123	31061	33600	17.2
Import	609	3737	5063	7627	9305	10424	8890	11680	14019	23.3
Export	940	5457	6242	6828	8889	9260	10751	11994	13292	19.3
M Pénétration	21.8	31.1	33.5	36.5	40.9	40.2	35.2	38.0	40.8	1.3
X Performance	25.2	31.2	29.2	26.6	28.1	26.3	29.9	28.1	27.9	0.2
NETHERLANDS (1)										
Production	2865390	7190499	8299601	7893295	11834261	9656810	9714812	9112089	9817296	8.6
Import	4383164	11013818	12521794	10464871	10893642	11398412	13565398	12900448	14498623	8.3
Export	2226333	4849840	5624691	6863221	7844101	7865856	8276406	7104376	7770281	8.7
M Pénétration	87.3	82.5	82.4	91.0	73.2	86.4	90.4	86.5	87.6	0.0
X Performance	30.7	26.6	27.0	37.4	34.5	37.4	35.6	32.3	32.0	0.1
NORWAY (1)										
Production	3472671	8525378	8197174	9350319	9951185	11327742	8894545	8623609	9176621	6.7
Import	5082517	8158739	9201700	7909838	13328146	17917765	16943469	17137088	20075312	9.6
Export	2613112	11361307	6985330	5665622	6793491	9653371	9524212	8290905	13940346	11.8
M Pénétration	85.5	153.3	88.4	68.2	80.8	91.5	103.9	98.1	131.1	3.0
X Performance	30.5	68.1	40.1	32.8	29.2	33.0	36.9	32.2	47.7	1.1
PORTUGAL (1)										
Production	5810000	31220000	41230000	54350000	62970000	72600000	85100000	88600000	131472500	23.1
Import	4637380	20671346	26198559	37239490	37642009	67905266	95353153	87053768	98264045	22.6
Export	275336	4087120	6764265	10861939	8453836	12969336	26606120	46434015	69333163	41.3
M Pénétration	45.6	43.2	43.2	46.1	51.4	53.2	62.0	67.4	54.5	0.6
X Performance	2.6	7.9	10.0	11.9	7.0	9.2	14.7	26.4	21.5	1.3
SPAIN (2)										
Production	120000	702000	798000	967000	1020000	1175000	1446000	1522800	1698220	19.3
Import	16409	56426	80153	121214	152990	178482	216987	273178	323227	22.0
Export	15548	138378	173994	208505	244067	312794	472701	629272	660156	28.4
M Penetration	13.6	9.1	11.4	13.8	16.5	17.2	18.2	23.4	23.7	0.7
X Performance	11.4	18.2	19.8	19.2	20.8	23.1	28.4	35.0	32.7	1.4
SWEDEN (1)										
Production	11243046	29980254	36010045	34393600	37966829	44926531	54303618	62527433	69715994	12.4
Import	3391978	9278096	11735946	11344715	12184050	14958239	18051118	21066103	24821173	14.2
Export	3555379	17018173	19703072	19584822	24291146	29352099	37053824	42577401	45262972	15.0
M Pénétration	37.4	41.7	41.8	43.4	47.1	49.0	51.1	51.4	50.4	0.9
X Performance	38.8	43.3	41.3	42.8	48.4	49.0	51.2	50.9	47.9	0.7
TURKEY (3)										
Production	2260	37400	63200	108800	170400	257200	369900	544100	755743	47.3
Import	990	8599	9021	20918	51098	106291	143863	234272	467062	50.7
Export	4	200	840	4100	15232	19146	20640	57322	82553	95.5
M Pénétration	30.5	18.8	12.6	16.7	24.8	30.9	29.2	32.5	41.0	0.7
X Performance	0.1	0.4	1.2	3.2	6.9	5.3	4.0	7.4	6.8	0.4
YUGOSLAVIA (2)										
Production	13700	81700	99000	125700	180000	244300	348200	556200	1068900	33.7
Import	4386	16964	23370	25712	30691	44128	45743	84136	147537	26.4
Export	2502	15154	14050	26135	29446	45583	64627	150154	273374	36.7
M Pénétration	28.1	20.3	21.6	20.5	16.9	18.2	13.9	17.2	15.6	-0.8
X Performance	13.8	15.4	11.5	17.3	14.0	15.8	16.4	23.4	22.5	0.6

Notes :

1) Thousands. 2) Million. 3) Thousands U.S. dollars.

APPENDIX C: VALUE OF PRODUCTION FOR ISIC DIVISION 38

TOTAL TRADE AND PRODUCTION
in national currencies

COMMERCE TOTAL ET PRODUCTION
en monnaies locales

Product : 385--

Produit : 385--

	1970	1978	1979	1980	1981	1982	1983	1984	1985	85/70
GERMANY (1)										
Production	8549653	15499194	16677086	18120624	18154812	20122812	21211875	23677897	27541630	8.1
Import	1771219	5564594	6286304	7328549	8038448	8084014	8560440	9795482	11136968	13.0
Export	4189092	8882650	9687513	10679299	11994240	12863813	13389249	15550895	18395436	10.4
M Pénétration	28.9	45.7	47.4	49.6	56.6	52.8	52.3	54.7	54.9	1.7
X Performance	40.6	42.2	42.2	42.0	45.8	45.7	45.0	46.5	47.6	0.5
GREECE (1)										
Production	160000	644000	842000	620000	670000	1062920	1265450	1546380	1892670	17.9
Import	761418	4007440	4864176	6138037	7362146	7521759	9756439	13818800	19629969	24.2
Export	9570	214406	59437	278662	340555	430913	410608	537340	765603	33.9
M Pénétration	83.5	90.3	86.1	94.7	95.7	92.2	91.9	93.3	94.6	0.7
X Performance	1.0	4.6	1.0	4.1	4.2	5.0	3.7	3.6	3.6	0.2
IRELAND (1)										
Production	17000	110000	130000	142000	200000	255000	332000	364540	440830	24.2
Import	11425	62758	76718	92902	108400	136732	164617	205742	227480	22.1
Export	10163	100448	118281	125910	171035	220353	314679	405977	429582	28.4
M Pénétration	62.6	86.8	86.8	85.2	78.9	79.8	90.5	125.2	95.3	2.2
X Performance	35.8	58.1	57.2	53.6	55.5	56.3	63.4	71.2	64.3	1.9
ITALY (2)										
Production	284	794	1022	1343	1494	1480	1915	2424	2154	14.5
Import	176	940	1220	1691	2110	2350	2622	3222	3872	22.9
Export	124	620	759	934	1178	1366	1634	1970	2405	21.9
M Pénétration	52.3	84.4	82.3	80.5	87.0	93.7	90.3	87.6	106.9	3.6
X Performance	26.9	35.8	33.9	30.8	32.7	33.9	36.0	34.9	39.9	0.9
NETHERLANDS (1)										
Production	187827	1440001	1349998	846201	786989	1060799	788100	794497	865500	10.7
Import	1073761	2437106	2774380	3103792	3522026	3550665	3930498	4840908	5169427	11.0
Export	832322	2569517	2841733	2907884	3230079	3332799	4076160	5241903	5433769	13.3
M Pénétration	250.1	186.4	216.3	297.8	326.4	329.2	596.4	1230.2	859.9	40.7
X Performance	66.0	66.3	68.9	73.6	75.0	76.6	86.0	93.0	90.0	1.6
NORWAY (1)										
Production	133043	305586	303763	274512	339549	352487	400871	533882	694224	11.6
Import	462586	1453961	1601437	1862848	2088421	2283997	2380883	2839467	3648165	14.8
Export	81367	377581	490867	689835	866867	887818	914881	985796	1264862	20.1
M Pénétration	90.0	103.2	113.2	128.7	134.8	130.6	127.7	118.8	118.5	1.9
X Performance	13.7	21.5	25.8	32.3	35.8	33.7	33.0	29.2	29.1	1.8
PORTUGAL (1)										
Production	65000	910000	1370000	1610000	2010000	2800000	3700000	4800000	5869535	32.6
Import	766553	4476742	5864915	8788387	10911380	14413274	16116411	17369710	21043752	24.7
Export	78343	1134455	1906961	2739815	3398697	3727273	4117381	5274161	6912038	34.8
M Pénétration	99.1	105.3	110.1	114.8	114.6	106.9	102.7	102.8	103.2	0.4
X Performance	9.2	21.1	26.4	26.3	26.3	21.7	20.8	23.8	23.7	1.1
SPAIN (2)										
Production	5000	22000	27000	26000	27000	28000	34000	37390	41700	15.2
Import	9390	44718	47638	62501	75509	85647	111544	113945	142883	19.9
Export	840	5388	7453	9892	11930	14285	18002	17208	24885	29.3
M Pénétration	69.3	72.9	70.9	79.5	83.4	86.2	87.5	85.2	89.3	1.3
X Performance	5.8	8.1	10.0	11.2	11.6	12.6	12.4	11.2	13.5	9.5
SWEDEN (1)										
Production	919193	2433589	2867454	2918711	3436343	3819370	4646255	5292134	6013001	13.3
Import	969536	2702764	3118533	3593779	3744443	4610995	5347015	6306260	7244118	14.4
Export	431165	1652660	1903445	2335199	2736235	3143065	4140519	4929801	5923107	19.1
M Pénétration	66.4	77.6	76.4	86.0	84.2	87.2	91.6	94.6	98.8	2.2
X Performance	22.9	32.2	31.8	35.9	38.1	37.3	40.6	42.5	44.7	1.5
TURKEY (3)										
Production	36	600	1100	1400	2800	3300	6100	8100	13035	48.1
Import	136	953	1062	4138	8554	13131	26875	48107	70334	32.7
Export	1	0	2	11	154	398	356	578	10160	91.3
M Pénétration	79.4	61.4	49.2	74.9	76.4	75.5	82.4	86.5	96.5	1.1
X Performance	0.3	0.0	0.1	0.2	1.4	1.9	1.1	1.0	11.1	0.7
YUGOSLAVIA (2)										
Production	700	3200	3800	5000	7600	10400	15700	26700	49000	32.9
Import	613	4040	6431	7303	7563	9038	12017	24813	41259	32.4
Export	69	1101	1642	2578	3646	5163	6884	14935	20136	46.0
M Pénétration	49.4	65.8	73.2	75.1	66.5	63.3	57.7	67.8	58.2	0.6
X Performance	5.3	15.2	14.1	21.0	22.7	26.6	24.8	29.8	22.1	1.1

Notes :
1) Thousands. 2) Million. 3) Thousands U.S. dollars.