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FUTURE STRUCTURAL CHANGES IN THE INDUSTRY OF SWITZERLAND*

Prepared by the
Global and Conceptual Studies Section
International Centre for Industrial Studies

UNIDO Working Papers on Structural Changes
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FOREWORD

This study was undertaken in the framework of UNIDO's research programme on industrial redeployment and structural adjustment. It constitutes a part of a first series of country studies designed to analyze past changes in the industrial structure of individual developed countries and to obtain an overview of future developments.

It is believed that by initiating and carrying out these studies and ensuring a broad dissemination of the reports, UNIDO may contribute to reducing uncertainties and highlighting pertinent trends of development and adjustment pressures, thereby creating a basis for an anticipatory adjustment policy. Concomitantly, the results would seem to be of direct relevance for the international debate on the future restructuring of world industrial production and trade, and for the conception of suitable policies and forms of industrial co-operation between the developed and the developing countries.

It is foreseen that additional studies be undertaken for attaining, on the one hand, a greater country average and, on the other, more disaggregated findings. In addition to carrying out its own studies, UNIDO will also endeavour to use relevant data and studies undertaken by other researchers in the respective countries. UNIDO and the informal International Working Group on Restructuring will co-ordinate the individual country studies. It will be attempted to assess the development prospects of developed countries in light of the industrialization plans and priorities of the developing countries. All findings will be regularly published and distributed.

This study of structural change in Switzerland was prepared by Silvio Borner, Gaudenz Prader, Bruno Simma, Barbara Stuckey, Karl Ulmi and Felix Wehrle of ICME (Industrial Consulting and Management Engineering Company) and the Institute for Applied Economic Research, Basel, as UNIDO consultants, in co-operation with the UNIDO Secretariat (International Centre for Industrial Studies).

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I. PREVIEW OF THE REPORT'S CONTENTS

For several reasons the Swiss experience in redeploying industry is of special interest. First, Switzerland is very highly industrialized and has an extremely world-market-oriented industrial structure. Consequently, many diverse indicators of internationalized production and exchange reach record levels. Second, between the late 1950's and the early 1970's, Swiss industry made use of foreign labour to an extent not matched anywhere else in the world. During and since the recession of 1975/1976, about 250,000 foreign workers have left Switzerland, and it seems politically unlikely that they will be authorized to return. Needless to say, redeployment is a close substitute for the import of labour and industrial inputs. Third, the Swiss franc has undergone dramatic revaluation since 1971, and especially since the beginning of floating exchange rates in 1973. Fourth, domestic economic growth is expected to be much slower than in the past. Taken together, these reasons mean that past trends and developments can at most be interpreted as hints of clues. In no way can they be justifiably used as the basis for extrapolated forecasts or model building.

Part II deals with the many dimensions of Swiss participation in the world market economy. From this perspective redeployment activities are examined. From official statements and records of government actions, the relevance of national economic policies for industrial redeployment have been inferred. Since the beginning of the severe slump in 1974, such policies have, in general, been increasingly devoted to export promotion and to facilitating adjustment to industrial relocations.

Part III is the story of structural changes which have taken place within Swiss industry between 1968 and 1978. Swiss industry was disaggregated by branch (at the two-digit level) and all branches were analyzed and evaluated on the basis of a set of special characteristics of Swiss industry. All descriptions and evaluations of branch behaviour are relative. That is, all branch comparisons were done in terms of industry-wide production and employment averages.

In order to give a more complete picture, the main results of several single-industry studies (both published and unpublished) were added to the findings.

Part IV is a systematic effort to group industrial production activities located in Switzerland according to their competitive strength on both the world and the domestic markets. This was done for the fourteen industrial branches. The classification (or grouping) is based on three sets of criteria: indicators of demand; indicators of labour qualification; and indicators of foreign trade/price-cost competitiveness.

In Part V the lack of disaggregation in the branch analyses of Parts III and IV has been compensated for by investigating location decisions of individual firms. Despite the technical difficulties of data gathering and processing, this level of analysis proved quite rewarding. The analysis of the typical characteristics of firms engaged in redeployment, of the products and production processes involved, and of the quantitative dimension of relocated production and employment provides the background for comparisons between individual firms and branch data and for the examination of location decisions of Swiss multinational firms.

The summary and conclusions - Part VI - have a two-fold nature. First, the most important findings of Parts II, III, IV and V are summarized. These findings, in turn, lead to the following types of questions, questions which are very likely to become the centre of future discussions and debates over Swiss economic policy:

Is a further development of the international division of labour - with specialization, reationalization, relocations of production, and ever more complex trade relations - inevitable and/or desirable? For whom does it appear inevitable? For whom is it desirable?

II. SWITZERLAND AND THE WORLD ECONOMY

The fate of Swiss economic life depends fundamentally on external, i.e. international, relations. On the one hand, the domestic market has long since become too small to support the profitable operation of many types of industrial enterprises. Consequently, Swiss firms are already oriented primarily to the world market rather than to meeting domestic demand. Since the beginning of its industrialization, Switzerland, a country poor in natural resources, has had to rely on imports of raw materials. On the other hand, the proportion of the gross domestic product devoted to commodities and services exchanged with other countries is still rising; in the foreseeable future foreign trade can be expected to grow even faster than gross domestic product (GDP). Since the recession of 1974, exports especially have risen, while Swiss demand for imported goods is also on the increase (see Table II.1). All these developments are signs not only of Switzerland's past integration into the world market economy, but also of its ever-rising degree of integration into the international division of labour. Thus, this investigation into the changing industrial structure of Switzerland begins with an examination of Switzerland's place in the world market economy and its role in the international division of labour.

The following are limited to a summary presentation and interpretation of the external and internal conditions most important for understanding current developments in Swiss industry.[1/]

A. Characteristics of the World Economy

Currency policy and the rate of exchange

During the period of the Bretton Woods Agreement, Switzerland functioned as a low-wage country because of the under-valued Swiss franc. The relatively expensive imports gave domestic producers competitive advantages over foreign products on the Swiss market. In addition, Swiss production for export was

1/ F. Rühl, Studie über die mittelfristigen Aussichten der schweizerischen Wirtschaft, Vorort des Schweizerischen Handels- und Industrievereins, 1977; and G. Winterberger, Die Schweiz im internationalen Wettbewerb, Schriftenreihe des Vororts, No. 13, 1978, and Schweizer Monatshefte, Heft No. 4, April 1978.

favoured by the rate of exchange and expanded accordingly. Since the 1973 transition to a flexible rate of exchange, the Swiss franc has been exposed to a permanent upward pressure. From May 1971 to December 1977, the real revaluation rate of the Swiss franc - export weighted in relation to the currency of its fifteen most important trade partners - has been 41.5 per cent. This means that Swiss goods become more expensive, i.e. less competitive, on the world market, thus causing bigger and bigger structural problems for Swiss industry.

Table II.1 Foreign trade as percentage of the real gross domestic product

Year	Sale of goods and services to other countries	Purchase of goods and services from other countries
1960	26.0	24.2
1961	26.0	26.7
1962	26.3	28.3
1963	26.4	28.1
1964	26.6	29.2
1965	27.8	28.3
1966	28.5	28.5
1967	28.6	28.7
1968	30.4	30.2
1969	32.6	32.2
1970	32.8	34.5
1971	32.7	35.2
1972	33.7	36.6
1973	35.3	37.8
1974	35.1	36.9
1975	35.5	33.7
1976	(39.9)a/	(38.8)a/
1977	(42.6)b/	(41.1)b/
1978	(43.9)b/	(43.5)b/
1979	(45.1)b/	(44.9)b/

Source: Swiss Federal Office for Statistics.

a/ Provisional figures.

b/ Estimate.

In the short space of three years, the status of Switzerland as a profitable industrial location for the production of mass goods (goods with little differentiation and for which price, rather than quality, is the most important sales argument) has been called into question much more radically than ever before.

This dramatic and rapid change in the rate of exchange has been reflected less in a drop in the volume of exports than in a shrinking earning capacity for the Swiss export industry and a change in the type of investment taking place. An investigation by the Union Bank of Switzerland (1978) reveals that between 1975 and 1977, 84 per cent of investment in Switzerland was aimed at reducing costs rather than expanding capacity. Investment plans for 1978-1980 are essentially the same. One of the main ways for Swiss firms to escape the effects of the revaluation of the Swiss franc is redeployment of industry. Perhaps more than for any other country, the rate of currency exchange has become an essential factor in accelerating the redeployment of industrial production, yet, redeployment directly due to currency rates, however, is most likely to take place toward the United States and Southern Europe rather than toward the developing countries of the Third World.

The growth of the world economy and Swiss export potential

The future of Swiss foreign trade depends on the growth of import demand in other countries. Decisive for this is the growth of the real gross domestic product of the trading partners. An investigation carried out by Kneschaurek shows, however, that there has been a slow-down in the economic growth rates of those countries which have hitherto been the greatest purchasers of Swiss products.[1/] Conversely, there has been a high or accelerated rate of growth in precisely those countries - with the sole exception of the OPEC nations - with which Switzerland has only a modest commodity exchange or which show a low import elasticity for Swiss products. With the weakened growth of the world economy, the elasticities of other countries' imports from Switzerland are in general - with the above-mentioned exception of the OPEC countries - showing a sinking tendency. Even if the growth of the world economy turns out to be considerably higher than the modest growth opportunities for Switzerland (which Kneschaurek estimates to be at the most 2.5 per

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1/ F. Kneschaurek, $627; Gesamtwirtschaftliche Entwicklung, Mitteilungen des St. Aller Zentrums für Aukunfstforschung, No. 5, 15 March 1978.

cent per year), the export industry cannot automatically reckon on a higher growth rate than that of the domestic economy.

Since the oil crisis, and as a result of the economic power acquired by the OPEC countries and the developing countries - as the Group of 77 - and their correspondingly heightened political presence, world trade has become increasingly a matter for political negotiation. The old liberal economic order has been called into question as unjust. On the other hand, the protectionist tendencies induced by recession, high rates of inflation, and large numbers of unemployed in the industrialized countries are not to be overlooked. Despite all declarations of principle in its favour, free trade, to which Switzerland virtually owes its prosperity, is seriously threatened. Nevertheless, the pressure to earn foreign exchange for oil imports and the anxiety about retaliatory measures have so far served to hinder a strong display of trade protectionism by the Swiss Government.

Opinions are divided about the significance of Switzerland's dependency on other countries for oil, raw materials, and other imports and the reliability of their continued supply. The assessment of the Swiss advisory group of economists,[1] who anticipate neither a major disturbance in supplies from other countries in the short and medium terms (apart from unforeseeable political embargos) nor a deterioration in the real terms of exchange that would carry serious consequences for the nation's prosperity, seems realistic. However, solving problems of international debts is vital to Switzerland's export industry (since it has a considerable number of clients in economically weak countries) as well as to Switzerland's role as an international financier. Thus, two necessary preconditions for the expansion of world trade and therefore Swiss trade are the avoidance of a credit collapse and the willingness to finance an increasing indebtedness.

In an investigation into the impact of the export offensive of low-wage countries on the Swiss industrial goods market, Hollenstein[2] arrives at two important conclusions:

1/ G. Bombach, H. Kleinewefers, L. Weber, Gutachten: Lage und Probleme der schweizerischen Wirtschaft 1977/1978, Bericht der Expertengruppe "Wirtschaftslage", Bern, 1977.

2/ H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

(i) In spite of the high rate of growth, the imports from low-wage countries have shown an above-average growth rate;

(ii) In spite of the high rate of growth, the imports from low-wage countries comprise, as previously, a very small proportion of the Swiss domestic consumption of industrial goods. Since the beginning of the 1970's, the proportion of imports from the low-wage countries has risen from under 5 per cent to over 6 per cent. But such imports represent barely 2 per cent of domestic demand.

Hollenstein has shown that industrial products from the low-wage countries do not constitute a competitive pressure on Swiss industry as a whole. Only a splitting of the industrial sector into single branches and lines of production reveals the real competitive capacity of the low-wage countries: in certain branches and lines of production of consumer goods, the low-wages countries have been able to achieve far above average market shares. In these areas of production (cf. Part IV), the domestic suppliers are under considerable pressure to make structural adaptations. This pressure may in the near future result in further closures of factories in the area of the textile and wearing apparel industry, or even in construction-linked and/or technologically backward sections of the machinery and metal industry. The impact on the Swiss occupational structure will probably gain in significance.

B. Characteristics of the Economic Situation in Switzerland

The labour market

In the long run, demographic changes will perhaps exercise the greatest influence on the economic structure. Population increase, which has been a mainspring for economic growth, is diminishing. Today, the birth rate is even lower than what would be needed to guarantee net reproduction. The stop imposed since 1971 on the immigration of foreign workers and the recession-induced return of foreign workers to their home countries have resulted in an absolute shrinkage of the resident population. These factors, coupled with the prolonging of the average life-expectancy, mean that Swiss demographic development is characterized by two phenomena: stagnation of population growth and a growing proportion of the elderly. Changes in store for the

next decade are expected to be especially dramatic. With a constant rate of labour force participation, we can reckon that up to the year 1981 there will be a net expansion in the labour force of about 100,000 people as a result of the high-birth generations. By 1985, the supply situation on the labour market will be reversed. After 1990, it can be calculated that, because of the decline in births, there will even be an absolute decline in the total labour force. Such demographic changes imply that Swiss economic growth in the foreseeable future cannot come from increases in domestic demand.

In spite of a comparatively low rate of unemployment there is a structural overdemand for labour, especially in those areas of production, mostly low-wage, which predominantly employed foreign workers before the recession. At the same time, however, even the number of employed Swiss has fallen off. On the basis of the age and sex specific labour force participation rate of 1970, there is today a theoretical labour supply of about 2,450,000 Swiss, of which only 2,200,000 are employed. Consequently, the apparent relative scarcity of labour is to be interpreted not as an overall shortage in the labour supply, but rather as a structural consequence of the withdrawal of well over 200,000 foreign workers. What is in short supply today is, on the one hand, labour with specific qualification and mobility characteristics and, on the other hand, labour in branches of production where low wages and other conditions make work unattractive. The counterpart of this development is the number of Swiss people, likewise in the range of a good 200,000, who have been forced into "retirement". That is, there has been a decline in the labour force participation rate of the Swiss. This situation is also a result of the tendency of industry to undertake mainly rationalization investments. The very high level of Swiss labour costs raises increasing doubts about the viability of anything approaching labour-intensive/low-skill industrial production in Switzerland.

In the case of an economic revival a second bottleneck in the labour market for qualified skilled workers can certainly be expected. Given the nature of our educational system and wage structure, the industrial sector, in comparison with the service sector, is bound to come up against greater difficulties on the labour market. This will further accelerate the trend towards the tertiary sector.

The public sector

In the 1970's, the direct participation of the State in national economic life has risen considerably. The State's share in the gross national product has expanded from 22 per cent in 1970 to 31 per cent in 1976. If public enterprises and social security institutions are included in the national budget, the State's proportion has risen from 34 per cent to 44 per cent in the space of these six years. Indeed, the fiscal payments and contributions to social security, which, by international standards are high, are today one important guarantee of the very high standard of living and of social peace.

C. Switzerland's Adaptation to Recent Developments in the World Economy

The recession of 1974 triggered off cumulative processes, processes which have led to the most dramatic transformation of the Swiss economic structure since the Second World War. The causes for these somewhat difficult adaptations to the new conditions are to be found less in the recession itself, than in the earlier inflation-swollen economic structure of the 1960's and the 1970's. The undervaluation of the Swiss franc, the resort to hundreds of thousands of less-qualified foreign workers, the frictionless supply of oil and other raw materials at favourable prices, and the euphoria of growth unleashed by inflation have established economic structures in the last fifteen years which have subsequently proven to be distorted and out of all proportion. The changes in the world economy described above, together with the sudden about-face of Switzerland's economic policy, have resulted in a variety of pressures on the private sector to adapt. The adaptation strategies of industrial firms in Switzerland to developments in the world economy can be summarized as follows:

(i) Opening up new sales markets;

(ii) Product innovation and innovation in the production processes as parts of an internal restructuring; and

(iii) Redeployment of production to other countries.

A new orientation towards the markets for Swiss products

The most conspicuous structural change in Swiss industry has occurred in the expansion of sales in foreign markets. Since domestic economic activity was shrinking and thus providing no impulse to growth, industry was compelled to seek the balance overseas. Existing foreign markets were cultivated with increased vigour, new markets were opened up, and enterprises which up until then had been oriented towards domestic demand attempted to replace their shrinking home sales with foreign sales. The construction industry, which was most severely affected, provides the most impressive example of this adaptation strategy. Several of the larger construction firms succeeded in gaining a foot inside the door of new foreign markets (especially in the OPEC countries) and thereby in compensating their losses of turnover in the home market. For individual enterprises, the opening of new markets overseas certainly involves additional risks. But greater diversification of Swiss exports to countries where economic growth is taking place may well diminish the fluctuations in the demand for Swiss goods and consequently improve the stability of the nation's economic structure.

Change in production methods and types of goods produced

Swiss industry has attempted, as part of its adjustment strategy, to realize its potential qualitative "competitive advantages", such as:

- Greater capacity to adjust to the customers' wishes;
- Greater flexibility in product mix, thanks to small production series;
- The building up of customer services;
- Strict observance of conditions for delivery;
- High quality and durability of Swiss products.

Other results of the changes in the general conditions of the world economy were increased pressures to:

- Change methods of production;
- Implement deferred rationalization measures; and
- Get rid of areas of production which were making a loss.

An inquiry carried out by the Swiss Federation of Commerce and Industry revealed that the tendency to capital-intensive and know-how-intensive products was asserting itself:1/

1/ F. Rühl, Studie über die mittelfristigen Aussichten der schweizerischen Wirtschaft, Vorort des Schweizerischen Handels- und Industrievereins, 1977.

> "In cases where higher proportions of technological know-how and/or a high capital intensity are required in production, the industrial country, Switzerland, is to be recommended as the location, since these two factors of production are still cheaper there than in the Third World. Production processes in which simple labour predominates are however no longer profitable in Switzerland.

Another part of the adaptation strategies of Swiss industry has been the expansion within individual firms of industrial services in the creation of value. Consultation, comprehensive problem-solving and the issuing of licences now complement and even displace the mere production of goods.

The role of foreign trade during the recession

In 1974-1975, Switzerland suffered the most severe economic dip of all the OECD nations. Whereas most industrialized countries were able to register an upswing in autumn 1975, even in 1976 the Swiss real gross domestic product still remained under the level of the previous year. The important export successes of Swiss industry and the improvement in the balance of trade in 1976 rest primarily on the lagging behind of economic recovery in Switzerland. Although exports shrank in 1975 for the first time since 1958, international trade exercised a stabilizing effect on Switzerland. In an investigation of the Centre for Economic Research (The Swiss Federal Institute for Technology, Zurich) Stalder[1/] has shown that the stabilizing effect of foreign trade during 1975 was not the result of an "astounding" export success, but was primarily due to a reduction in the import quota (causing decreases in the warehouse stock of raw materials and semi-finished goods). Despite the rise in the export quota, the export industry was unable to maintain its share of world trade.

In 1976, Switzerland slightly recovered from the severe recession of the previous year. The major impulse came almost exclusively from foreign demand, whereas domestic demand stagnated or was still on the decline. With a real rate of growth of over 10 per cent, Switzerland's exports unexpectedly profited handsomely from the upswing in the international business cycle. What is more difficult to interpret than the growth in exports is the boom in imports. The real growth in the buying of goods from other countries was 13.5 per cent. This was higher than the 11.5 per cent growth rate in exported goods. Since the prices of imported goods sank 4.6 per cent more than the

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1/ P. Stalder, Die Rolle des Aussenhandels in der Rezession, WIF/ETH Monatsbericht No. 4, 1977.

prices of the exported goods, the rise in the value of exports ultimately outweighed the growth in imports. This differential development in prices led to Switzerland's first trade surplus since 1953.

In 1977, the "high period" of export trade continued, undiminished. Because of the improved economic situation and the corresponding growth in demand for imports, the 1977 balance of trade again resulted in a deficit. Over the next years it is predicted that there will be a rise in the trade deficit, but the record deficit of the early seventies is scarcely likely to be reached again.

A glance back at history shows how a business recession traditionally leads to a reduction in the trade deficit. In 1953 and 1976, it even led to a balance of payments surplus. Conversely, economic recovery causes a greater surplus of imports, thereby reducing stress on the Swiss franc. Given flexible exchange rates, the export of material goods is impeded by the increase of the capital revenue surplus, this leading as it does to a higher exchange rate of the franc. The question to what degree Switzerland's exports will experience displacement or substitution as a result of increased activity in other countries, will be addressed in Part IV, in which the results of an investigation of industrial branches is presented.

D. Trade Relations by Economic Blocks, with Special Reference to the Developing Countries

Switzerland's foreign trade traditionally shows an import surplus. Since 1938, apart from three exceptions, the Swiss trade balance has always been negative. Until the recession of 1974, the import explosion had led to a new record deficit of 7,576 million francs.

Switzerland's foreign trade is characterized firstly by a long-term stability in the countries with whom she trades and secondly by the limited number of her major trading partners. The ten most important suppliers to Switzerland account for as much as 80 per cent of Switzerland's imports, her ten most important customers for 60 per cent of her exports. An initial analysis shows the overwhelming influence of Europe on Switzerland's trade realtions. Four-fifths of Switzerland's imports and two-thirds of her exports circulate within the continent. The trade surplus realized with the rest of the world does not on the average balance out Switzerland's chronic deficit with European countries.

Table II.2 The development of Switzerland's imports and exports (1970-197.)

Year	Exports in millions of francs	Percentage change in money value over the previous year	Volume-Index (1970=100)	Percentage change over the previous year according to volume
1970	22,140.3		100.0	
1971	23,616.9	+ 6.7	103.0	+ 3.0
1972	26,187.6	+ 10.9	109.0	+ 5.8
1973	29,948.3	+ 14.4	121.0	+ 11.0
1974	35,353.1	+ 18.0	126.4	+ 4.5
1975	33,429.7	- 5.4	116.1	- 8.2
1976	37,044.8	+ 10.8	129.[illegible]	+ 11.[illegible]
1977	42,158.5	+ 13.8	144.8	+ 11.8

Year	Exports in millions of francs	Percentage change in money value over the previous year	Volume-Index (1970=100)	Percentage change over the previous year according to volume
1970	27,873.5		100.0	
1971	29,641.6	+ 6.3	105.2	+ 5.2
1972	32,371.5	+ 9.2	112.9	+ 7.3
1973	36,588.6	+ 13.0	119.6	+ 5.9
1974	42,929.4	+ 17.3	117.8	- 1.5
1975	34,267.8	- 20.2	97.5	- 17.2
1976	36,871.2	+ 7.6	110.7	+ 13.5
1977	43,026.1	+ 16.7	121.9	+ 10.1

Source: "Die Volkswirtschaft", a monthly review edited by the Swiss Federal Ministry of Public Economy.

The statistics allow us only limited scope in determining the origin of imported commodities as well as the intended estination of exports. If a semi-finished product from a developing country is finished in an industrialized country, then the industrialized country appears in the foreign trade statistics as the place of origin. Given the nature of Swiss imports, this has, on the whole, little statistical significance. However, the low share of imports

Table II.3 Switzerland's foreign trade 1938-1977

Year	Import		Export		Balance	Value of exports as a percentage of value of imports
	Tons	Millions of francs	Tons	Millions of francs	Millions of francs	
1938	7,379,200	1,606.9	611,047	1,316.6	- 290.3	81.9
1939	8,659,121	1,889.4	539,671	1,297.6	- 591.8	68.7
1940	6,113,509	1,853.6	498,957	1,315.7	- 537.9	71.0
1941	4,786,736	2,024.3	502,204	1,463.3	- 561.0	72.3
1942	4,315,751	2,049.3	398,957	1,571.7	- 477.6	76.7
1943	3,971,192	1,727.1	365,685	1,628.9	- 98.2	94.3
1944	2,622,340	1,185.9	304,745	1,131.8	- 54.1	95.4
1945	1,460,521	1,225.4	176,119	1,473.7	248.3	120.3
1946	5,440,398	3,422.5	496,485	2,675.5	- 747.0	78.2
1947	7,756,665	4,820.0	453,434	3,267.6	-1,552.4	67.3
1948	8,476,761	4,998.9	676,647	3,434.5	-1,564.4	68.7
1949	7,081,651	3,791.0	511,860	3,456.7	- 334.3	91.2
1950	8,500,640	4,535.9	597,429	3,910.9	- 625.0	86.2
1951	10,135,557	5,915.5	643,608	4,690.9	-1,221.6	79.3
1952	9,148,649	5,205.7	621,537	4,748.9	- 456.8	91.2
1953	8,736,738	5,070.7	690,631	5,164.6	93.9	101.9
1954	10,169,339	5,591.6	808,333	5,271.5	- 320.1	94.3
1955	11,190,611	6,401.2	850,644	5,622.2	- 779.0	87.8
1956	13,037,801	7,597.0	893,765	6,203.5	-1,393.5	81.7
1957	13,289,472	8,447.1	909,197	6,713.9	-1,733.2	79.5
1958	11,781,934	7,335.2	957,502	6,648.8	- 686.4	90.6
1959	12,688,627	8,267.9	1,206,321	7,273.8	- 994.1	88.0
1960	15,292,953	9,648.1	1,470,588	8,130.7	-1,517.4	84.3
1961	17,176,675	11,644.4	1,350,313	8,822.1	-2,822.3	75.8
1962	19,154,404	12,985.5	1,332,320	9,579.9	-3,405.6	73.8
1963	21,298,812	13,989.4	1,583,315	10,441.7	-3,547.7	74.6
1964	21,891,647	15,540.8	1,776,390	11,461.6	-4,079.2	73.8
1965	22,707,970	15,929.3	2,047,304	12,861.0	-3,068.3	80.7
1966	22,794,709	17,004.5	2,113,109	14,203.8	-2,800.7	83.5
1967	23,884,727	17,786.0	2,200,772	15,164.8	-2,621.2	85.3
1968	25,614,192	19,424.9	2,684,206	17,349.5	-2,075.4	89.3
1969	27,818,302	22,734.4	2,872,787	20,009.1	-2,725.3	88.0
1970	31,059,751	27,873.5	2,908,120	22,140.3	-5,733.2	79.4
1971	31,995,183	29,641.6	2,868,712	23,616.9	-6,024.7	79.7
1972	34,756,028	32,371.5	3,180,943	26,187.6	-6,183.9	80.9
1973	37,234,914	36,588.6	3,607,206	29,948.3	-6,640.3	81.9
1974	34,848,746	42,929.4	4,013,738	35,353.1	-7,576.3	82.4
1975	28,634,571	34,267.8	3,631,136	33,420.7	- 838.1	97.6
1976	30,031,794	36,871.2	3,942,665	37,044.8	173.6	100.5
1977	31,003,000	43,026.1	4,327,000	42,158.5	- 867.6	98.0

Source: Swiss Federal Customs Directorate.

from the OPEC countries is only partially due to Switzerland's low energy needs (in comparison, for example, to the United States). Rather, in this case there is a definite problem in the way in which the statistical data has been collected. Oil from the OPEC countries that has been refined in France and the Netherlands does not enter the foreign trade statistics as an OPEC import. Nevertheless, Switzerland's imports are overwhelmingly from the western industrialized countries. As Hollenstein's study[1] shows, even though the developing countries' shares of imports are growing at a faster than average rate, in absolute numbers they have not managed to reach more than a modest level. There is reason to suspect, however, that Switzerland has to a certain degree a demand backlog for imports from the developing countries and from the CMEA countries.

A good one-third of Switzerland's prosperity is directly dependent on her many and varied relationships with other countries; indirectly her prosperity is completely dependent on these external relations. Surprisingly, however, when we examine her export goods as a proportion of her GDP, Switzerland does not occupy a top position in comparison with other nations.

Table II.4 Export goods (f.o.b.)[a] as a percentage of GDP (1976)

	Percentage		Percentage
Switzerland	26.2	Federal Republic of Germany	22.9
Total OECD	14.5	Great Britain	21.3
Belgium	48.9	Austria	21.1
The Netherlands	43.9	France	16.1
Italy	22.6	United States of America	6.8

Source: OECD, Switzerland, April 1978.

a/ f.o.b.: "Free on board" (price of a good, including transportation and insurance costs only to the point of disembarcation).

Switzerland's close involvement with other countries does not fully emerge until we examine her export goods and services as a proportion of the gross domestic product.

1/ H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

Table II.5 Export goods and services as a percentage of the GDP

	1973	1977
Switzerland	35.3	42.3
Total OECD	15.0	16.0
Belgium	50.3	51.0
The Netherlands	56.9	55.9
Austria	35.1	36.5

Source: OECD, report on Switzerland, April 1978.

This table reveals two peculiarities of Swiss foreign trade:

(i) The Swiss tertiary sector's share of total exports is significantly higher than for other OECD countries;

(ii) Whereas the export quota of the western industrialized countries stagnated during the recession, Switzerland shows an enormous rise in export dependency.

In complete contrast to her imports, Switzerland's exports are distributed in almost the same proportions as the exports of the other industrialized countries of the West. The proportions of her exports to the developing countries and the OPEC countries are even somewhat less.

Table II.6 Distribution of exports: Economic blocks and Switzerland, 1975

(Per cent)

Export \ Import	OECD	Developing countries	OPEC	CMEA	Total
OECD	69.6	16.4	7.9	6.0	100
Developing countries	60.4	24.8	6.9	7.9	100
OPEC	77.0	20.8	0.4	1.8	100
CMEA	27.9	12.8	3.5	55.8	100
Switzerland	72.9	14.3	6.6	6.2	100

Source: F. Kneschaurek, Arbeitsgruppe Perspektivstudien, Entwicklungsperspektiven der schweizerischen Volkswirtschaft bis zum Jahr 2000, Teil 3, Branchenmässige Entwicklungsperspektiven, Band 1, St. Gallen, 1971; and Gesamtwirtschaftliche Entwicklung, Mitteilungen des St. Galler Zentrums für Zukunftsforschung Nr. 5, 15 March 1978.

Table II.7 Distribution of imports: Economic blocks and Switzerland, 1977
(Per cent)

Import \ Export	OECD	Developing countries	OPEC	CMEA	Total
OECD	70.3	10.6	14.8	4.2	100
Developing countries	61.7	16.2	14.9	7.1	100
OPEC	81.6	12.4	3.3	2.3	100
CMEA	37.6	8.6	2.2	51.6	100
Switzerland	87.5	5.9	3.8	2.8	100

Source: See Table II.6.

The analysis in the next pages is based on the division of Swiss foreign trade into trade flows with the following economic blocks: OECD (including South Africa), CMEA (including North Vietnam, the People's Republic of China, Mongolia, and North Korea), OPEC and the developing countries.

OECD

The significance of the OECD area for Switzerland's foreign trade is, despite a slightly falling tendency, still dominant. In 1977, OECD countries accounted for 85.9 per cent of Swiss imports and 71 per cent of Swiss exports. Given the decrease of economic growth in the western industrialized countries, this enormous concentration presents problems for Switzerland.

European Economic Community (EEC)

Within the OECD countries, Switzerland's foreign trade is further very one-sidedly concentrated on the EEC. The Federal Republic of Germany, France and Italy alone account for 50 per cent of all Swiss imports. Even after a slight decline the EEC still accounts for two-thirds of Switzerland's imports. About 45 per cent of Swiss exports go to the EEC. Switzerland's three EEC neighbours, the Federal Republic of Germany, France and Italy, absorb one-third of her total exports and are far and away Switzerland's most important trading partners. In 1977, Switzerland's trade with the EEC showed a debit balance (in some cases enormous) with all the member countries except Denmark. Her deficit with the Federal Republic of Germany was even higher than the total exports to the European Free Trade Association (EFTA) countries.

European Free Trade Association (EFTA)

Trade exchange with the EFTA countries has not developed as well as was expected. After the founding of EFTA in 1960, imports doubled to reach their highest level of 10 per cent in 1970; but since the first round of tariff reductions with the Common Market they have consistently lost their importance. With a less dramatic leap, exports reached 11 - 12 per cent of the total volume. Austria, the most important EFTA partner, occupies sixth place as the most important of Swiss trade partners, behind the United States and Great Britain. In 1977, Switzerland showed a positive trade balance with all the members of EFTA except Finland, an associate of EFTA.

United States of America

Trade relations with the United States have severely declined and have accounted for only 6.7 per cent of imports and 6.6 per cent of exports in 1977. The reduction in commodity sales to the United States is a striking example of how the classical pattern of exports has been replaced by the re-deployment of industrial production. In 1978, Swiss firms employed about 70,000 people in the United States. (There are 40,000 epople employed by American firms operating i Switzerland.)

Council for Mutual Economic Assistance (CMEA)

Trade with the Eastern block countries has never played a significant role for Switzerland. There has been a gradual rise in imports to 3.6 per cent, while exports have declined to 5.4 per cent. Thanks to the export of investment goods to Poland, the German Democratic Republic and Hungary, Switzerland regularly shows a trade surplus in her trade with the Eastern block. Since 1976, Switzerland's trade with the USSR shows, for the first time, a negative balance because of the imports of energy. It is notable that the structure of goods traded with the CMEA countries resembles to an ever greater extent the structure of exchange with developing countries. The import of raw materials and energy offsets the export of investment goods. As before, there are still administrative difficulties limiting the development of trade with CMEA countries.

Organization of Petroleum-Exporting Countries (OPEC)

Contrary to expectations, Switzerland's balance of trade with the thirteen OPEC nations is not negative, but quite the opposite (see, however, the methodological remarks in Part II). The Swiss export surplus has risen markedly since the 1974 rise in oil prices.

Table II.8 $\frac{\text{Export}}{\text{Import}}$ with OPEC

(Percentage)

	1972	1973	1974	1975	1976	1977
Percentage	157	122	38(!)	169	244	268

Source: Swiss Federal Customs Directorate; calculations by F. Wehrle.

Whereas imports have stagnated at the level of 3.2 per cent, partly as a result of the fall in the dollar, exports have expanded in an almost explosive fashion and already amount to 8.7 per cent. OPEC imports of Swiss investment and consumer goods have increased by an average of over 33 per cent during the last four years and that in the middle of the recession! Even if we take into account the oil crisis as a factor in triggering off the recession, Swiss industry has profited unambiguously from the boom in demand from the members of OPEC. The trade surplus with the OPEC nations already covers one-third of the trade deficit with the industrialized countries of the West. Today, Iran and Saudi Arabia count among the most important of Switzerland's trade partners.

Developing countries

In order to take into account the great heterogeneity among, and the rapid changes occurring within, the developing countries, we will analyze Switzerland's trade relations with this block in terms of three categories:

Category 1. Developing countries in the narrower sense.
This traditional definition embraces the following countries: Africa with the exception of South Africa; Asia except Israel, Hong Kong and Japan; Latin America.

Category 2. Developing countries in the narrower sense without the 13 OPEC countries.

Category 3. Developing countries in the wider sense.

Category 3, the most comprehensive, is the one applied in the official foreign trade statistics and diverges from Category 1 in the following way:

- In Europe, it includes Yugoslavia, Cyprus, Malta and Gibraltar;
- In Asia, it includes Israel and Hong Kong;
- It does not include the centrally-planned developing countries: People's Republic of China, North Korea,

The following comments concerning data on the global foreign trade, ordered according to the three categories of developing countries, are valid only from the point of view of Switzerland. Any interpretations from this data concerning individual developing countries are liable to be misleading.

The very heterogeneous aggregate of developing countries in the sense of Category 3 (i.e. including the OPEC countries), already in 1975, accounted for one-fifth of all Swiss exports. By 1978, it accounted for one quarter. Because of the quadrupling of the price of natural oil, the imports from this economic block show a sudden leap, and by 1977 had reached 10.2 per cent.

Table II.9 Switzerland's exports to developing countries as a percentage of the total exports (1977)

Country	Percentage		
Iran	2.1	}	40 per cent of all Swiss exports to developing countries
Israel	2.1		
Saudi Arabia	1.9		
Hong Kong	1.5		
Yugoslavia	1.4		
Brazil	1.0		
Nigeria	0.9		
Algeria	0.8		
Total	11.7	- - - -	51 per cent of all Swiss exports to developing countries
All developing countries	22.8		

Source: Swiss Federal Customs Directorate, calculations by F. Wehrle.

Swiss exports are concentrated on a very few developing countries. The twelve most important purchasers account for as much as two-thirds of the total exports to developing countries, the most populous economic block. In addition, there is a very one-sided flow of exports to the "rich developing countries". Of the twelve most important recipients, Brazil and Mexico alone belong to Category 2, "developing countries in the narrower sense".

Table II.10 Switzerland's imports from the developing countries as a percentage of total imports (1977)

Country	Percentage	
Arabian Emirate	1.2	36 per cent of all Swiss imports from developing countries
Hong Kong	0.9	
Iran	0.6	
Brazil	0.5	
India	0.5	
Nigeria	0.4	
Israel	0.4	
Yugoslavia	0.3	
Total	4.8	47 per cent of all Swiss imports from developing countries
All developing countries	10.2	

Source: Swiss Federal Customs Directorate; calculations by F. Wehrle.

In comparison to its exports, Switzerland's imports are somewhat more widely distributed. Despite this, the great majority of developing countries account for only a tiny portion of imports. The same "rich developing countries" appear once again as the most important trading partners.

What is decisive for Switzerland is the large balance of payments surplus with the developing countries. For years now, the ratio of exports to imports has been 2:1. Thanks to this positive balance of trade Switzerland has been able to compensate (averaged over the last three years) about three-fourths of her chronic balance of payments deficit with the Western industrialized countries.

A different picture emerges when we examine the development of the trade flows to the developing countries using Category 2, that is, excluding the OPEC countries. Although there are no official statistics available, it quickly becomes obvious that the growth of Swiss trade with developing countries as a whole (Category 3) has been mainly to the advantage of the OPEC countries. This growth has occurred in part at the expense of the least developed countries! Whereas the developing countries' share of Swiss exports rose as a whole during 1976 by 0.5 per cent to reach 21.3 per cent, the OPEC nations' share rose by 1.3 per cent to reach 7.8 per cent. The proportion of Swiss exports to the developing countries in the narrower sense (Category 2), on the contrary, diminished by almost one-third, from 10.2 per cent to 7 per cent. As regards Swiss imports, it was primarily the developing countries in the widest sense (Category 3) which increased their share in 1976, while the developing countries in the narrower sense were only able to improve their share slightly to 4.8 per cent. Surprisingly, the OPEC countries lost ground.

What is the meaning of these contradictory trade patterns with the Third World? In contrast to the stable foreign trade structure with the industrialized countries, the trade flows with the developing countries are undergoing very dramatic fluctuations. Often there is no clear trend to be deduced from the rates of growth. Moreover, the absolute trade flows are relatively small and consist of only one or a few major products. Thus the statistics reveal the sensitivity to any changes whatsoever in any of these few products.

Summary

(i) The proportion of Switzerland's foreign trade with the developing countries as a whole has risen and continues to rise;

(ii) Switzerland's balance of payments' surplus with the developing countries (with an export/import ratio of 2:1) will continue to grow with a rising volume of trade and provides a welcome balance for the deficit with the industrialized countries;

(iii) The above-average growth of trade with the developing countries is very one-sidedly distributed in favour of the oil-exporting countries and a few of the more industrialized of the developing countries;

(iv) Among the countries listed as Switzerland's twenty most important trading partners are Israel, Hong Kong, Brazil, the Arab Emirates, Yugoslavia, Iran and Saudi Arabia;

(v) The successful export offensive of Swiss industry aimed at the OPEC countries has had an essential mitigating effect on the recession at home.

In Parts IV and V we will see that the same developing countries which are significant as Switzerland's foreign trade partners are also most significant in terms of industrial redeployment. It may be that in the case of the developing countries, in contrast to the United States, expansion of Switzerland's foreign trade and redeployment of Swiss industry are not competitive alternatives, but rather mutually support one another.

It can be clearly seen that the poorest countries do not really figure in Switzerland's export offensive. Because of their severe balance of payments problems, their demand for Swiss products is lower. Moreover, their material and non-material infrastructure is inadequate for the redeployment of Swiss industry. Before we turn to the redeployment problem in detail, we shall add a very brief description of Switzerland's economic foreign policy.

E. The Goals and Instruments of Switzerland's Economic Foreign Policy

Both Switzerland's foreign trade relations and their adaptation to recent developments in the world economy are almost exclusively the result of the decisions of private firms. Because of the persisting weakness of domestic demand and the small size of the Swiss market, export has to play the role of the motor of the domestic business cycle. Consequently, Switzerland's economic policy up to the present has been restricted to establishing exports. Stimulation of domestic demand and employment promotion are at the moment not considered seriously by Swiss policy-makers as alternatives to export promotion. Therefore, Switzerland's economic policies, beyond ensuring a profitable climate for private enterprise, mean for the most part foreign trade policy.

The overriding goal of Switzerland's economic foreign policy is the liberalisation of world trade. In support of the market model for international economic relations, Switzerland - in the area of tariff and trade agreements (GATT) - supports the removal of limitations to world trade. Former member of the Swiss Federal Council Brugger[1] defined the overriding goal of Swiss trade policy as follows: facilitating the access of Switzerland's export industry and services to the markets of other countries. As complementary goals he enumerated (among others) the following: protecting the liberalization of international trade, maintaining the import and purchasing capacity of the developing countries, facilitating export financing, and promoting trade opportunities for small- and medium-sized firms.

Except in the area of agriculture, Switzerland's willingness to accept free trade for imports as a necessary precondition for free trade in exports is scarcely matched by that of any other country. Domestic producers, threatened by imports, must face competition without state help and adapt to the changed conditions of that competition.

The explicit basis for co-operation with developing countries is "to help those who help themselves" and to promote further integration of the developing countries into the world market economy. As far as Switzerland's development aid and co-operation are concerned, what is at issue is maintaining and strengthening the capacity of the developing countries to absorb Swiss exports and investments. Conversely, Switzerland is willing to accept the export offensive of low-wage countries as part of current developments in the world market economy. Despite the demands of the adversely affected industries inside Switzerland, the Swiss Government has renounced protective measures. On the other hand, the state's support of the redeployment of industry to the developing countries has not found any expression in the official catalogue of Swiss policies toward the Third World. "We cannot accept either the demand of the developing countries for a state-promoted redeployment of certain industries to their countries nor can we accept a limitation on the production of competitive synthetic products in the industrialized nations. What we can do, on the contrary, is not to impede, by state intervention, processes resulting out of competition."[2] Switzerland's public aid for

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1/ E. Brugger, in G. Rehsche, Schweizerische Aussenwirtschaftspolitik und Dritte Welt, Entwicklungspolitische Beiträge 3, April 1977.

2/ P. Lévy, Die Schweiz in der Weltwirtschaft, Aktuelle Tendenzen des Welthandels und der Beziehungen zur Dritten Welt; das schweizerische Verhalten gegenüber diesen Tendenzen, Lecture, Baden, 1977.

development, which in 1977 was only 0.19 per cent, remains significantly behind that of the OECD countries (0.31 per cent) and consequently far behind the DAC[1] demand of 0.7 per cent. For this reason, Swiss economic policy-makers are at pains not to limit the market conditioned competitive advantages of the developing countries through protective measures. With a consistent policy of free trade, Swiss policy-makers are seeking to counteract the tendencies in the developing courtries to disengage from the world market economy.

The state's instruments for implementing economic foreign policy support the endeavours of Swiss firms in other countries. The state itself has neither the desire nor the power to engage in exporting. The instruments of economic foreign policy, taken as a whole, are designed to promote exports, a policy intended to insure the prosperity of Switzerland. Since the recession, the gaps in Swiss export promotion have been successfully closed and Swiss industry has been enabled to take advantage of competitive opportunities overseas.

Export Risk Guarantee (ERG)

The federal export risk guarantee is a traditional cornerstone of economic foreign policy. The ERG was established in 1934 as a means of creating work and procuring foreign exchange. The legislation in effect today stems from 1958 and describes the goal of the ERG as the creation and maintenance of work opportunities and the promotion of foreign trade. The guarantee consists of an assurance that certain export transactions will be partially covered in the event of a loss of, or a relapse in, payments. The ERG, in exchange for a fee, covers the risks which result from production, payment, or transfer difficulties - all common in the export business.[2] The following risks can be insured against singly or together through the ERG:

- Currency exchange risk: Payments for damages arising from currency exchange risks. (Such payments, as a proportion of total payments for damages, have risen from 9 per cent in 1975 to 70 per cent in 1977. The introduction of the currency guarantee in the spring of 1975 for debts more

1/ DAC = Development Assistant Committee of the OECD.

2/ H.J. Meyer-Marsilius, Die Förderung des schweizerischen Exports, Mitteilungen der Bundesstelle für Aussenhandelsinformation, May 1977, No. BM 120.

than three months overdue primarily served to shore up the industries exporting consumer goods.)

- Transfer risk: Payments to cover: (i) difficulties of transfer in the international movement of capital, or (ii) losses due to the invoking of moratoria.
- Bad debt risks: Payments to compensate for the inability or refusal on the part of state corporations (as orderers or guarantors) to pay.
- Political risk: Payments made when political events render it impossible for the debtors to fulfil their obligations.
- Production risk: Payments to compensate for impossibility of production and/or delivery.

Bad debt risks to firms not possessing their own state's loan guarantee are explicitly not covered.

Most significant are the demands for ERG payments according to branches of industry and countries. In 1977, the ERG was most strongly in demand from the machinery industry; newly-opened guarantees amounted to 4,799 million francs. In this branch, the proportion of exports covered by the ERG amounts to 26 per cent of total exports. Next comes the chemical industry with 1,726 million francs (20.9 per cent), the watch industry with 216 million francs (6.4 per cent), and the textile industry with 175 million francs (6.8 per cent).

In the geographical structure of the obligations covered by the guarantees at present amounting to 16.2 milliard francs, the developing countries' proportion is conspicuously high at 55 per cent in 1977 compared to 48 per cent in 1976.

Investment Risk Guarantee (IRG)

In contrast to the ERG, the IRG, established as part of Switzerland's policy toward developing countries, has not attained any great significance since its introduction in 1970. The Federal Government can guarantee investment undertakings in other countries against certain risks up to a maximum of 500 million francs. The guarantees are basically limited to investments in developing countries. The guarantee can amount to at maximum 70 per cent of the invested sum. With only about 20 per cent of the IRG funds being used,

this economic foreign policy instrument has up to now failed to have much impact.[1]

Table II.11 Obligations covered by the ERG according to economic areas
(Percentages of shares of the total)

Economic area	Percentage
Africa	21.18
Asia	16.10
Latin America	8.95
All developing countries (including Southern Europe)	55.00
CMEA	12.84
EFTA	4.40
EEC	16.75
United States and Canada	11.14

Source: Finanz und Wirtschaft, Zurich, 15 April 1978.

Export financing

In accordance with an agreement between the Swiss National Bank and the Swiss Bankers' Association, short-term credits on preferential terms to alleviate liquidity problems are guaranteed by the banks to export branches - such as the watch, textile, and shoe industries[2] - which have been most severely hit by the recession. This discounting of short-term export bills means a yearly subsidy to exporters, or in other words, credit cheapening, of about 25 million francs. Three-fifths of this credit cheapening is paid for by the commercial banks and two-fifths by the Swiss National Bank. In the case of export credits to be repaid over a period of more than five years,

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1/ G. Berweger, Investition und Legitimation, Privatinvestitionen in Entwicklungsländern als Teil der schweizerischen Legitimationsproblematik, Diss., St. Gallen, 1977.

2/ G. Rehsche, Schweizerische Aussenwirtschaftspolitik und Dritte Welt, Entwicklungspolitische Beiträge 8, April 1977.

the commercial banks participate to keep the rate of interest unchanged.[1/] Thanks to this compromise with the commercial banks, Switzerland has for the meantime given up the idea of establishing an export credit bank.

An indirect form of export financing is provided for by the multilateral credits to the international development banks, all wing Swiss industry to bid on development bank projects. Bilateral credits are practically all tied to the delivery of Swiss commodities.

Trade diplomacy

We intend this general term to refer to all state measures which directly support the sales efforts of Swiss exporters. Since the recession, Switzerland has made great efforts to place trade diplomacy increasingly at the service of export promotion. Because the presence of diplomats with their many contacts has advantages to the export industry, Switzerland has built up her political representation above all in the Near East. Trade delegates with diplomatic status have been installed in Saudi Arabia, the Gulf states, Indonesia, Nigeria and Venezuela. These trade delegates are assigned to the Embassy and are responsible to the political department, but they work exclusively for the interests of Switzerland's export industries. Switzerland also has trade agreements with 35 states, investment protection agreements with 22 states, and economic and technical co-operation agreements with 36 nations.

The classical instrument of Swiss trade policies has been the Swiss Office for the Development of Trade. Under the auspices of this organisation, Swiss authorities and representatives of trade and industry pursue together their common goals:

(i) Furthering and extending Switzerland's economic relations with other countries;

(ii) Strengthening the Swiss economic image overseas; and

(iii) Consolidating and strengthening Switzerland's presence in other countries.

An important activity in the promotion of trade is the system of exhibitions and fairs (for example, the 1976 Swiss Fair in Cairo) as well as the implementation of special advertising campaigns. In addition, the Swiss

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1/ H.J. Meyer-Marsilius, Die Förderung des schweizerischen Exports, Mitteilungen der Bundesstelle für Aussenhandelsinformation, May 1977, No. BM 120.

Office for the Development of Trade's statement of purposes foresees the promotion of exports from the developing countries to Switzerland. This promotion, however, is limited to advertizing the addresses of Swiss importers and to providing minor market reports.

The last points to be mentioned, and perhaps the most important ones for understanding Swiss trade diplomacy, are multilateral arrangements and economic agreements. Consistent with her policy of liberalizing trade, Switzerland seeks by means of these trade agreements to achieve the most favourable conditions for her export industry. The most significant agreements are the liberalization arrangements through OECD and the free-trade agreement with the European Economic Community. With the completion of European tariff reductions in 1977, Switzerland's membership in EFTA has lost much of its importance. Switzerland participates in international economic negotiations through her representatives in GATT and her collaboration in OECD. After the outbreak of the oil crisis in 1974, the OECD governments committed themselves through the "Trade-Pledge" agreements to the maintenance of world-wide conditions for free trade. The "Trade-Pledge" expressly contains a clause repudiating the use of trade restrictions or export subsidies for the purpose of achieving a national balance of trade.[1/] This regulation, renewed annually, has been especially profitable for Switzerland, with her extreme dependence on exports. In the long run, the economic agreements with state-trading countries, membership in numerous subordinate organizations of the United Nations, for example, UNIDO and UNCTAD, may become increasingly important.

Facilitating structural adaptation at home

Switzerland's economic policy was, and still ist, very one-sidedly aimed at the promotion of free trade and exports. Because of the difficulties caused by the recession, difficulties which affected above all the small- and medium-sized firms, the demand for a structural adaptation policy can not longer be ignored. The "Impulseprogramme" for the years 1977 to 1982 is seen as a programme to help those who help themselves. With this programme the Federal Government intends to promote - at a cost of 70 million francs -

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1/ P.R. Jolles, Die Schweiz in den Bestrebungen nach Neuordnung der internationalen Wirtschaftsbeziehungen, Schriften des Vororts, No. 11, 1977.

above all the export-oriented industries. The "Impulseprogramme" is intended, on the one hand, to make it easier for small- and medium-sized firms to introduce new technologies and to open new markets. On the other hand, the programme is designed to ease the necessary structural transformation in the watch industry, in the construction sector, and in the transport industry.

For the purpose of improving the structure of economically threatened regions, the Swiss Federal Council has approved financial aid for the renewal and diversification of investments. By means of interest subsidies and security guarantees by the Confederation and the Cantons, the intention is to trigger off a long-term improvement of structural conditions.

In comparison to structural adaptation policies of other countries or to Switzerland's own export-promotion policies, Switzerland's structural problems are, as in the past, still being neglected at the policy level.

III. STRUCTURAL CHANGES IN SWISS INDUSTRY 1968-1978[1/]

Over the past ten years, manufacturing has lost importance as an employer inside Switzerland. Not unexpectedly, the tertiary sector has partially taken up the slack. The percentage of the total workforce employed in manufacturing (including electricity, gas and water) has dropped from 40.1 per cent in 1967 to 36.7 per cent in 1976. In 1970, manufacturing (including electricity, gas and water) accounted for 39 per cent of the gross domestic product.

Table III.1 provides an overview of the development of employment in the different branches of Swiss industry. Although a secular trend favouring the tertiary sector had set in long before 1968, it is nevertheless striking that industrial employment in Switzerland did not begin to decline in absolute terms until 1971. This decline then accelerated with the collapse of employment in the industrial sector during the recession of 1975-1976, an absolute decline which was above average by international standards, and which cannot be compensated for by growth in the tertiary sector. Each of these developments is closely connected to the employment of foreign workers inside Switzerland.

Looking at the employment figures, only (1) food, beverages and tobacco, (2) printing and publishing, (3) chemicals and (4) metals and machinery reveal an above-average level of employment in 1977. All branches, however, are below pre-recession levels. This decline is particularly pronounced in textiles and wearing apparel, in non-metallic mineral industries (related to the collapse of the Swiss construction industry) and in the watch industry. Table III.2 shows the corresponding changes in the distribution of employment among the branches (given the lack of a detailed index of industrial production and/or value-added statistics we have resorted to using employment figures) and the proportion of foreign workers employed in the branches.

The period from 1968 (in some cases 1967) up to 1977 was chosen as our frame of reference in order to compare the recession years with a longer period of high employment. The following branches have increased their share of the total labour force employed in industry since 1967:

1/ The Appendix to Part III contains a short summary of several other studies of Swiss industry.

Table III.1 Index of output (P) and employment (B) in Swiss manufacturing; 1968 = 100

		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Manufacturing total	P	100.0	110.0	119.2	121.7	125.0	130.8	132.5	113.3	115.5	119.7
	B	100.0	100.7	100.9	100.9	99.1	98.3	98.0	88.9	84.7	84.6
Food, beverages and tobacco	P	100.0	106.0	112.6	117.6	121.7	126.9	120.9	113.4	118.4	122.6
	B	100.0	99.5	98.1	98.9	98.5	99.3	97.6	92.0	90.0	90.6
Textiles	P	100.0	104.0	102.0	103.0	111.9	113.9	110.9	93.1	106.3	107.3
	B	100.0	99.7	95.0	92.0	87.8	87.0	83.6	72.3	71.2	70.4
Wearing apparel, shoes, etc.	P	100.0	104.5	104.5	105.3	105.3	101.7	96.5	91.1	110.6	114.1
	B	100.0	99.1	95.5	91.5	89.3	85.3	79.8	70.4	69.0	68.0
Wood, cork, etc.	P	100.0	108.6	115.3	120.0	125.8	136.2	130.5	106.8	105.7	116.2
	B	100.0	100.3	99.9	99.3	99.2	98.7	96.7	83.0	77.4	78.3
Paper and paper goods	P	100.0	104.0	110.5	103.2	98.4	102.4	112.1	77.4	83.9	91.2
	B	100.0	97.0	97.4	95.4	94.0	93.5	95.6	86.4	83.9	83.3
Printing and publishing	P	100.0	108.6	117.9	117.9	115.8	115.0	112.2	95.7	95.7	93.6
	B	100.0	101.1	100.2	102.0	100.2	97.9	98.2	91.2	87.4	87.8
Leather, rubber, plastics	P	100.0	116.2	128.7	129.4	128.2	139.0	133.8	122.1	148.5	166.1
	B	100.0	101.0	102.0	100.5	99.5	96.8	93.1	80.5	79.0	77.7
Chemicals	P	100.0	122.7	129.5	135.6	144.0	159.8	170.4	143.9	172.7	171.2
	B	100.0	106.1	111.4	115.7	115.4	115.7	117.1	114.5	111.2	109.7
Non-metallic mineral products except petroleum and coal	P	100.0	108.9	116.9	128.6	133.0	139.3	130.3	87.5	87.5	86.6
	B	100.0	97.4	96.3	96.4	95.9	97.2	93.3	78.6	81.6	72.2
Metals	P	100.0	109.3	118.7	122.4	123.4	132.7	129.0	100.0	100.9	111.2
	B	100.0	100.9	101.6	103.0	106.3	107.7	106.9	94.7	87.1	86.7
Machinery and equipment	P	100.0	110.0	126.7	130.0	128.2	134.3	140.1	127.5	113.4	117.6
	B	100.0	101.8	103.1	103.7	99.7	97.6	99.9	94.0	89.7	85.4
Watches, jewelry, engraving	P	100.0	105.7	107.8	105.0	116.4	123.4	125.6	101.5	99.3	105.7
	B	100.0	100.9	105.3	100.7	95.0	95.8	99.0	80.5	73.0	75.1
In comparison:											
Employment in the tertiary sector		100.0	102.0	103.8	105.9	107.5	109.7	110.5	107.6	105.6	106.5
Total employment		100.0	101.2	102.0	103.3	103.5	103.6	103.0	94.5	90.9	91.2

Source: Volkswirtschaft (a monthly review edited by the Federal Ministry of Public Economy).

Table III.2 Total employment and employment of foreign workers from 1967 to 1977 by branches

(Percentage distributions)

	Employment distribution in per cent			Foreign workers in per cent of employed			
	1967	1970	1977	1967	1970	1973	1977
Manufacturing total	100.0	100.0	100.0	34.1	35.8	37.0	32.8
Food, beverages and tobacco	7.2	7.1	7.8	31.1	31.5	34.5	29.9
- Food and animal feed	5.3	5.2	6.0	32.7	32.9	36.5	31.2
- Beverages	1.1	1.1	1.1	20.3	19.2	20.2	17.0
- Tobacco	0.8	0.8	0.7	35.2	38.6	41.0	38.9
Textiles	7.5	6.8	5.9	47.8	49.9	50.6	49.7
- Yarn, thread, fibres	2.6	2.3	2.2	53.7	57.1	57.2	55.1
- Fabrics	3.1	2.9	2.4	45.5	46.9	48.4	46.8
- Embroidery	0.5	0.5	0.3	44.3	43.8	41.0	41.9
- Finishing	1.1	1.0	0.8	44.2	46.4	46.4	45.9
Wearing apparel, shoes, etc.	7.9	7.1	5.9	57.2	60.2	61.9	59.3
- Woven fabrics	3.8	3.5	3.0	61.8	64.6	66.4	63.7
- Knitted fabrics	1.7	1.6	1.4	58.1	62.1	63.8	60.6
- Shoes	1.6	1.4	0.9	51.5	53.8	53.5	53.5
Wood, cork, etc.	5.0	5.4	4.2	33.1	33.5	35.0	28.3
- Woodwork and wooden semi-manufactures	0.9	0.8	0.7	34.7	34.5	34.1	29.5
- Furniture, construction elements	3.4	3.4	2.9	32.9	34.0	36.4	28.8
Prams, toys, sporting goods	0.2	0.2	0.2	39.0	35.3	21.6	26.4
Paper and paper goods	2.5	2.3	2.4	33.3	35.3	37.4	31.6
- Cellulose, paper, cardboard	1.1	1.0	1.2	25.8	28.9	32.0	28.7
- Other paper goods	0.6	0.6	0.7	33.2	35.7	39.0	30.5
Printing and publishing	5.7	6.0	6.1	19.8	21.1	23.0	20.4
- Book and newspaper printing	4.1	4.1	4.1	16.9	18.4	20.2	18.4
- Lithography, offset, photo-engraving	0.6	0.8	1.1	24.0	26.2	29.2	23.7
Leather (without shoes)	0.5	0.5	0.4	45.4	45.0	47.8	42.1
Rubber, plastics	1.5	1.7	2.2	37.3	38.5	39.8	34.0
Chemicals	6.4	7.4	9.0	19.6	24.0	28.4	27.6
- Miscellaneous chemical products	1.6	2.5	5.1	21.0	25.0	30.8	30.0
- Synthetic and natural dyes	1.3	1.2	0.1	17.9	27.1	33.2	28.7
- Pharmaceuticals, cosmetics	1.2	1.4	1.7	18.4	21.6	26.1	25.3
Non-metallic mineral products except petroleum and coal	3.4	3.2	2.7	46.3	46.2	48.4	37.7
- Artificial stones, cement, gypsum	1.3	1.3	1.1	50.8	52.5	53.9	38.9
Metals	13.6	13.7	13.6	36.1	38.2	38.6	34.5
- Fabricated metal products	5.4	5.5	5.9	35.4	36.4	36.8	33.1
Machinery and equipment	29.9	30.4	32.1	31.8	34.0	34.3	30.1
- Machines and appliances	24.4	25.9	29.7	32.0	34.4	34.4	30.3
- Machines and appliances of miscellaneous types	4.3	6.1	6.0	31.1	37.0	36.8	32.9
- Machine tools	2.2	2.3	2.6	26.5	29.9	30.2	27.4
- Textile machinery	2.1	2.3	2.8	34.1	38.6	40.8	36.1
- Precision instruments, optical and medical	2.4	2.8	2.5	33.2	34.7	33.9	30.2
- All others	10.7	9.6	12.7	33.7	33.4	33.1	29.4
- Vehicles, transport equipment	2.7	2.6	2.3	33.7	33.8	34.8	27.6
Watch industry	8.3	8.3	7.0	22.5	27.0	30.4	26.6
Jewelry, engraving	0.5	0.5	0.5	28.4	35.8	38.1	41.4

Source: Volkswirtschaft (a monthly review edited by the Swiss Federal Ministry of Public Economy).

- Food, beverages, tobacco (mainly food and animal feed);
- Subgroups of the paper industry;
- Printing and publishing (mainly lithography, off-set and copper-plate printing;
- Rubber, plastics;
- Chemicals (with the exception of synthetic and natural dyes);
- Metal goods;
- Machinery (with the exception of automobiles and transportation).

As a proportion of the total industrial labour force, the number of employees in the following areas has remained the same since 1967:

- Beverages;
- Perambulators, toys and sporting goods;
- Book and newspaper printing.

In all other branches, the numbers employed have fallen as a proportion of the total industrial labour force and in the following branches by over 20 per cent:

- Textiles and wearing apparel;
- Synthetic and natural dyes;
- Non-metallic mineral products.

The use of subcategories not only provides an indication of the crucial areas within the branches, but they are also indicative of the statistical difficulty of a further disaggregation of the data. For example, more than one-half of those employed in chemicals fall under the subcategory of "miscellaneous chemical products", thus not permitting further classification. Similarly the most important category in the machine industry is "Machines and appliances of miscellaneous types", as well as "all others". It can be ascertained that the strong increases in the proportions of employed are to be attributed, as one would suspect, to "new" lines of production within the branches, but the methods of statistical collection do not allow us to identify precisely what these "new" lines of production are. Since 23.8 per cent of all those working in industry in 1977 were employed in these subcategories, special studies ought to be undertaken to identify the growth areas.

Table III.2 also provides information about the extent to which foreigners are employed in Switzerland. The employment of foreign workers reached a high point in 1973 in both absolute and relative terms, with 37 per cent of the total industrial labour force. (This was two years after the total industrial

employment reached its highest level.) The migration of Swiss workers into the tertiary sector (or into the sharply expanding branches of industry) and their replacement by foreign workers was already occurring before 1971, though still relatively unnoticed. This trend then gathered strength in the early 1970's.

The presence of foreign workers is especially pronounced in those branches which have suffered very severe losses in their proportion of the total industrial labour force, namely textiles and wearing apparel, leather and non-metallic mineral industries. Conversely, the relatively expanding branches show a below-average (chemicals, printing and publishing) or average (rubber, plastics, sectors of metals and machinery) proportion of foreign workers. If the different levels of training between Swiss and foreign workers are taken into account, it is possible to make inferences about the quality of labour demanded by specific branches and therefore indirectly about the type of technology being used (see Part IV).

The decline in the proportion of foreign workers between 1973 and 1977 reveals clearly that the collapse in employment occurred to a great extent at the expense of foreign workers, and above all, at the expense of "non-resident" foreign workers, i.e. those having resident permits good for only one year or less. In 1967, the proportion of non-resident foreign workers was still 85.7 per cent of the total number of foreign workers; by 1973, it had sunk to 66.3 per cent and it then declined to 46.1 per cent in 1977. If one assumes that the liberal immigration policy of the past is scarcely likely to reoccur because of political considerations, then the "definitive" diminution of labour potential (about 250,000 foreign workers) which occurred during the recession takes on a real significance for future developments.

In considering industry as a whole, there are two phenomena which immediately catch one's attention:

(i) The small - in comparison to other countries - expansion of output: This is due to the small Swiss domestic market and the previously existing strength of Swiss industry overseas (the fifteen largest Swiss industrial firms employ 20 per cent of Switzerland's industrial labour force but produce only 26 per cent of their sales at home);[1/]

1/ Schweizerische Bankgesellschaft (Union Bank of Switzerland), Die Grössten Unternehmen der Schweiz, various editions, Zurich.

(ii) The income recovery from the recession, particularly in industrial activity: Apart from wearing apparel, chemicals, rubber and plastics, output has not yet reached pre-recession levels. The causes for this lie in the stagnation of domestic demand, in the contraction of population, and in the loss of international markets as a result of the appreciation in the rate of exchange. The latter has brought with it an investment depression which has now lasted for almost five years.

Table III.3 presents information on value added and capital intensity in the different industrial branches.

Only chemicals and rubber and plastics achieved unambiguous increases in their share of value added. Apart from food, beverages and tobacco, and machinery, all of which retained a more or less stagnant proportion, all other branches show a decline. Admittedly, the ratios of 1977 are still significantly distorted due to the business cycle: because of the trailing recovery, the proportions of consumer goods branches are too high compared to the trend, and those of investment goods branches are somewhat too low. The changes in value added per employee of the respective branches are worth pointing out. Chemicals as well as food, beverages and tobacco show, without exception, above-average levels, levels which are accompanied by a capital share that also lies above the average. The increase of value added per employee is confirmed in textiles and wearing apparel as well as in wood, rubber and plastics. The former is accompanied by below-average, the latter by above-average, capital intensity. In relation to industrial totals, all other branches show stagnating or even sinking value added per employee. Whether these 1973-1977 changes in the value added per employee are of a long-term, structural nature, is a question that cannot yet be answered definitely; the business cycle, know-how, profits, price elasticity, etc., must all be taken into consideration. The more basic proposition in this context - that more capital-intensive branches are less affected by wage-cost problems than less capital-intensive branches - may be retained.

Table III.4 gives an overview of the real gross value of production in the respective branches and of real imports and exports, expressed as percentages of the gross value of production. From this, it is possible to infer the foreign trade intensity of industry as a whole, as well as the significance

Table III.3 Value added and capital shares by branches from 1967 to 1977[a/]

	Value added in percent of the total in manufacturing (in constant prices)				Value added per employee (in 1000 Swiss francs of 1970)				Capital share in per cent of value added
	1967	1970	1973	1977	1967	1970	1973	1977	1970
Food, beverages and tobacco	13.8	13.0	13.3	14.0	27.7	33.2	37.0	39.1	53.7
Textiles	4.3	4.1	4.2	4.3	18.5	21.3	26.0	30.2	26.7
Wearing apparel, shoes, etc.	5.2	4.4	3.9	4.8	15.5	17.5	19.1	26.8	30.8
Wood, cork	6.2	5.9	6.4	5.9	22.9	27.5	32.9	35.4	45.6
Paper and paper goods	1.9	1.7	1.[illegible]	1.4	23.2	27.8	26.8	26.8	35.1
Printing and publishing	5.0	5.2	4.6	4.1	20.7	26.5	26.5	24.0	32.6
Leather, rubber, plastics	2.0	2.0	2.0	2.6	23.5	28.2	32.1	47.8	41.4
Chemicals	10.0	11.4	12.8	15.0	45.3	55.1	65.5	74.0	50.1
Non-metallic mineral products except petroleum and coal	3.6	3.4	3.7	2.5	27.5	34.8	41.1	34.4	44.5
Metals	17.4	16.6	16.9	15.5	25.2	29.7	31.3	32.6	39.3
Machinery and equipment	24.0	26.0	25.1	24.1	25.0	28.2	31.6	31.6	33.2
Watches, jewelry, engraving	7.2	6.3	6.6	6.1	22.5	23.3	29.3	32.1	31.7
Total	100.0	100.0	100.0	100.0	23.5	29.1	32.8	34.9	39.6

Source: Federal Office for Statistics, Bombach et.al., 1977; Volkswirtschaft.

a/ Limitations:

- A full analysis of the supply side of the Swiss gross domestic product exists only for 1970. The data given for 1967, 1973 and 1977 are therefore extrapolated. The calculations were made in the following way:
- Value added is estimated with the index of industrial production. Since this is a gross index, including inputs, its use in extrapolating from 1970 data implied that the relation between value added and inputs has not changed over the years.
- Value added per employee (productivity) is measured by using the index of productivity formed from Table III.1:

$$\left(\frac{\text{Index of production}}{\text{Index of employment}} \times 100\right)$$

- The mode of extrapolation does not take differential price developments into account.
- The capital share (or capital intensity) is calculated as the portion of current value added which represents returns to capital in the broad sense (including interests, profits and depreciation). That is, the capital share is value added minus wages and social security payments made by the firm. Because of the differential and fluctuating returns to equity capital, this figure is only an imperfect and indirect indicator for the amount of capital invested.

Table III.4 Gross value of production (prices of 1970) in billion Swiss francs and exports (X) and imports (M) in constant prices as percentages of gross value of production, 1967-1977[a/]

		1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Food, beverages, tobacco		13,738	14,325	15,185	16,130	16,846	17,434	18,178	17,319	16,245	16,961	17,562
	M		13.37	13.46	13.77	13.82	14.19	13.90	13.48	12.73	13.14	12.82
	X		7.19	7.77	8.18	8.37	7.48	8.07	7.99	8.54	8.76	9.67
Textiles		3,493	3,676	3,824	3,750	3,787	4,114	4,188	4,077	3,423	3,908	3,944
	M		42.79	47.66	53.59	57.54	58.97	64.95	64.11	65.57	67.90	69.58
	X		40.15	43.89	47.00	50.26	52.21	54.40	52.33	58.66	60.81	64.04
Wearing apparel, shoes, underwear		3,222	3,278	3,425	3,425	3,451	3,451	3,333	3,163	2,986	3,625	3,740
	M		17.50	21.69	24.56	27.42	30.96	33.35	37.15	36.04	35.46	35.79
	X		8.58	9.65	10.20	10.94	10.78	11.63	12.22	12.92	12.64	13.80
Paper and paper products		1,434	1,471	1,529	1,625	1,518	1,447	1,506	1,649	1,138	1,234	1,342
	M		29.30	35.11	39.59	40.12	47.55	52.01	50.87	52.96	58.95	58.52
	X		10.54	11.81	11.10	12.79	15.51	18.33	23.05	24.82	28.09	30.10
Printing and publishing		2,651	2,901	3,150	3,420	3,420	3,359	3,336	3,255	2,776	2,776	2,715
	M		10.51	10.18	10.11	10.25	11.71	12.48	12.29	13.29	13.54	14.91
	X		6.69	6.58	7.00	7.54	9.15	10.12	10.88	10.80	10.50	12.29
Leather, rubber, plastics		1,197	1,154	1,341	1,485	1,493	1,479	1,604	1,544	1,409	1,713	1,917
	M		65.23	65.45	66.20	72.35	79.20	78.75	80.40	66.41	64.55	65.89
	X		25.55	24.83	24.50	24.98	29.18	29.37	34.30	35.72	35.74	38.89

a/ For detailed comments on this table, Prader's working paper.

Table III.4 Gross value of production (prices of 1970) in billion Swiss francs and exports (X) and imports (M) in constant prices as percentages of gross value of production, 1967-1977

(continued)

		1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Chemicals		6,040	6,645	8,153	8,605	9,010	9,568	10,618	11,323	9,562	11,476	11,376
	M		30.81	30.03	32.86	32.95	33.70	33.96	33.85	31.71	31.60	34.41
	X		52.86	52.9	53.80	55.20	56.97	59.18	61.48	63.69	59.13	63.76
Non-metallic mineral products except petroleum and coal		2,010	2,066	2,250	2,415	2,657	2,748	2,878	2,692	1,808	1,808	1,789
	M		21.19	22.03	23.73	23.36	26.40	27.05	27.91	32.11	33.37	37.52
	X		5.31	5.58	5.37	4.84	4.73	4.98	6.29	8.29	9.00	11.08
Metals		11,082	11,171	12,210	13,260	13,673	13,785	14,824	14,411	11,171	11,272	12,422
	M		18.90	21.09	22.88	21.08	21.78	21.79	23.23	20.37	21.74	23.66
	X		11.90	12.45	11.86	11.37	12.85	13.84	15.74	19.11	22.97	24.35
Machinery and equipment		14,588	15,635	17,199	19,810	20,326	20,200	20,998	21,905	19,935	17,730	18,387
	M		26.92	28.04	29.48	30.19	32.16	32.13	30.80	26.26	30.23	33.32
	X		35.20	37.91	34.74	34.88	34.27	36.51	36.87	39.52	44.69	46.81
Watches, jewelry, musical instruments		5,495	5,613	5,933	6,015	5,894	6,534	6,927	7,050	5,697	5,574	5,933
	M		2.14	2.45	2.95	3.26	2.78	3.21	3.52	3.21	3.93	3.98
	X		44.74	48.87	43.45	43.16	41.43	41.07	39.68	38.61	39.06	40.42
Wood, cork		3,638	3,781	4,107	4,360	4,538	4,757	5,150	4,935	4,039	3,997	4,394
	M		14.85	15.71	17.41	17.58	19.63	20.18	20.06	17.43	19.67	20.19
	X		3.70	3.36	3.25	3.32	3.39	3.83	4.39	5.70	8.21	9.12
Total		67,256	70,721	77,794	84,300	86,068	88,402	92,504	93,706	80,127	81,683	84,653
	M		24.26	25.32	26.97	27.77	29.02	29.38	28.58	27.64	30.79	32.73
	X		25.92	26.74	26.30	26.49	27.28	28.95	29.87	32.07	35.09	37.87

of foreign trade for the individual branches. (For more detailed commentary on Table III.4 see the working paper of Prader.) Two important points must be mentioned here:

- In the foreign trade percentages for the machinery and equipment industries, only the commercial vehicles are included in the corresponding subcategory;
- In the cases of watches, jewelry, etc., the foreign trade percentages refer only to the watch industry, i.e. subtracting jewelry, etc., from the gross value of production, this percentage would be much higher.

Table III.5 indicates the difference between the export and import proportions in each branch, i.e. the real balance of trade as a percentage of the gross value of production.

If one considers Table III.4 in terms of the development of industry as a whole, what leaps to the eye is the steady growth of foreign trade over the last ten years (cf. Part II). Traditional net exporters are machinery, watches, and chemicals, and since 1976, temporarily metals. The latter may be an example of the fact that the recession and the poor recovery have forced branches with an over-capacity int exporting which often resulted in only poor returns. All other branches are traditionally net importers to a more or less considerable extent (cf. Table III.5).

Intra-industrial foreign trade is very high (export and import proportion more than 30 per cent in textiles, rubber and plastics; chemicals and machinery). Since 1977, this is also true of paper and paper products.

The non-metallic mineral industries, wood, cork and wearing apparel show a small proportion of exports, but comparatively, a very high proportion of imports. This is reversed in the watch industry. Branches which have been traditionally more oriented to domestic demand (with imports and exports below 25 per cent) are food, beverages and tobacco; printing and publishing; wood, cork; and metals (see Table III.4).

If the change in the real balance of trade is taken as a provisional indicator for the development of the international competitiveness of the respective branches, then those branches which have improved their balance of trade accounts (rise in the active, decline in the passive), are getting relatively more competitive than those where the balance of trade accounts

Table III.5 Real trade balances as percentage of the gross value of production at 1970 prices by branches from 1968 to 1977

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Food, beverages, tobacco	- 6.18	- 5.69	- 5.59	- 5.45	- 6.71	- 5.83	- 5.49	- 4.19	- 4.38	- 3.15
Textiles	- 2.64	- 3.77	- 6.59	- 7.28	- 6.76	-10.55	-11.78	- 6.91	- 7.09	- 5.54
Wearing apparel, shoes, underware	- 8.92	-12.04	-14.36	-16.48	-20.18	-21.72	-24.93	-23.12	-22.82	-21.99
Paper and paper products	-18.76	-23.30	-28.49	-27.33	-32.04	-33.68	-27.82	-28.14	-30.86	-28.42
Printing and publishing	- 3.82	- 3.60	- 3.11	- 2.71	- 2.56	- 2.36	- 1.41	- 2.49	- 3.04	- 2.62
Leather, rubber, plastics	-39.68	-40.62	-41.70	-47.37	-50.02	-49.38	-46.10	-30.69	-28.81	-27.00
Chemicals	22.05	22.87	20.94	22.25	23.27	25.22	27.63	31.98	27.53	29.35
Non-metallic mineral products except petroleum and coal	-15.88	-16.45	-18.36	-18.52	-21.67	-22.07	-21.62	-23.82	-24.37	-26.44
Metals	- 7.00	- 8.64	-11.02	- 9.71	- 8.93	- 7.95	- 7.59	- 1.26	1.23	0.69
Machinery and equipment	8.28	9.87	5.26	4.69	2.11	4.41	6.07	13.26	14.46	13.49
Watches, jewelry, musical instruments	42.60	40.42	40.50	39.90	38.65	37.86	36.16	35.40	35.13	36.44
Wood, cork	-11.15	-12.35	-14.16	-14.26	-16.24	-16.35	-15.67	-11.73	-11.46	-11.07
Total	1.66	1.42	- 0.67	- 1.28	- 1.74	- 0.43	1.29	4.43	4.30	5.14

Source: Volkswirtschaft, Foreign Trade Statistics, Bombach et.al., 1977, Federal Office for Statistics.

have deteriorated. The balance of trade averages are compared for three periods: 1968-1970, 1971-1973, 1974-1977 (see the Summary Table in Part IV). The branches with an increasing balance of trade have succeeded in:

- Making up for lost markets at home (due to competition of imports) by a higher proportion of exports; and/or
- successfully challenging the competition from imports.

Examination of Table III.5 reveals that between 1968 and 1977 textiles, wearing apparel, paper and paper products, and the non-metallic mineral industries had to put up with a deterioration in their balance of trade; all other branches showed improvement in their competitive situation. (It must be constantly remembered that all these comparisons are purely relative, i.e. in reference to other branches or to earlier positions. Price considerations would have to be taken into account in order to give precision and concreteness to these assertions.)

IV. BRANCH-LEVEL INDICATORS OF SWISS COMPETITIVENESS

The aim of Part IV is to report the results of an initial macro-economic evaluation of the competitive capacity of Swiss manufacturing. For this evaluation statistics which were already available have been used;[1/] thus the evaluation reflects the level of aggregation found in these statistics. Part IV is organized into three main sections:

(i) Theoretical construction of a set of indicators with which to assess the competitiveness of respective branches and with which to make a provisional classification of industrial branches. This classification is based on developmental tendencies in Swiss manufacturing during the period 1968 to 1978. (Tables are to be found in the Appendix to Part IV; methodological principles and sources are laid out in a working paper by G. Prader.)

(ii) Individual branch-specific analyses carried out on the basis of the developed set of indicators.

(iii) Classification of Swiss manufacturing branches according to characteristics of their competitiveness.

1/ Analysis in Part IV also, to some extent, relies on the studies discussed in the Appendix to Part III and on the following studies:

- W. Hill, Die Wettbewerbsstellung der schweizerischen Uhrenindustrie (confidential), Basel, 1977;
- Studiengruppe der Féderation Horlogère Suisse (FH), Die schweizerische Uhrenindustrie in der Sicht der nächsten zehn Jahre (confidential), 1976;
- H. Jürgensen, Die schweizerische Metall- und Maschinenbauindustrie, discontinued pilot study (confidential), Hamburg, 1975;
- D. Maillat et.al., Transfert d'emploi vers les pays qui disposent d'un surplus de main-d'oeuvre comme alternative aux migrations internationales - le cas de la Suisse I-III.

Three studies produced in 1977 under the auspices of the International Labour Organization (the third was a field survey).

- Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Papers on Structural Changes, No. 7, May 1979;
- A. Nydegger, Vier Teilberichte zur Textilindustrie, Part 1, St. Gall, 1978. (This part is limited to the investigation of world-wide demand for textile goods; the other parts are still in preparation.)

A. Methodological Approach and Rough Estimation of the Competitiveness of Swiss Manufacturing

Statistical difficulties and the structural discontinuity of Swiss economic development during the last five years raise three preliminary problems which must be dealt with:

(i) If the most recent recession may not indicate the end of the post-war growth era in general, it at least indicates the end of a specific period of post-war growth. The factors triggering off this recession and contemporary changes in the international division of labour have not yet led to a new, visibly stable path of development. The business upswing which is developing only falteringly and the ongoing structural transformations make it impossible to build up a clear picture with the data that exist today. That is, we cannot yet statistically separate the effects of cyclical phenomena from the effects of long-term structural changes. Hence, an analysis of the more recent past can neither rest exclusively on developments which took place before the recession; nor is it possible to unambiguously exclude the cyclical components of the years after 1973.

(ii) Basically, an analysis of the competitiveness of Swiss manufacturing should contain to an equal extent an examination of supply and demand. In view of the great statistical difficulties which would immediately be posed by an investigation of foreign markets, the present study is more oriented to supply. In other words, the structure of demand is inferred from the quantity of goods sold and from the prices which are paid for imported and exported goods.

(iii) In effect, this investigation presupposes the existence of an annual production account for the Swiss industrial sector. However, for Switzerland there exists only one solitary national production account (= supply side of the GDP), namely that for 1970. Because of this, we must infer value added statistics from the available gross indices (see Prader's working paper).

The examination of the international competitiveness of Swiss industry would in principle have to rest explicitly on a comparison of the performance of the same branches (producing in Switzerland and in other countries - especially developing countries) on national and/or international sales and supply markets. For statistical reasons, however, the examination rests on an analysis of positive and negative deviations of single branches of Swiss industry from the Swiss industrial average. (For a more detailed explanation of this procedure and its theoretical underpinnings, see Prader's working paper.)

The analysis of the relative competitiveness of different branches is based on the following indicators (see Prader's working paper for discussions of the methodology):

1. Indicator of quantitative demand: The index of industrial production and (as a complement) changes in employment are used;

2. Indicator of the qualification level of the labour force: There are two items that serve this function:
   (i) the percentage of foreign labour employed in each branch;
   (ii) the absolute wage level of each specific branch.

   Additional differences are revealed through the division of foreign workers into residents and non-residents, who are less qualified (see Part III).

3. Price indicators: The import and export price indices were used.

4. Involvement in foreign trade and its development: The real balance of trade is measured as a percentage of the gross value of production of the respective branches.

5. Indicators of cost competitiveness: These are primarily the changes in the wage cost per unit of output of the branches, as well as the corresponding productivity trend. In order to estimate the cost competitiveness on the export or home markets, the relationship of changes in wage cost per unit of output to changes in export or import prices were relied on.

The indicators sketched in the previous pages must now be combined and integrated before they can be applied to the individual branches. The starting

point for the resulting classification of the relative competitive capacities is the following Summary Table.

This Table refers to the years 1968-1977. In order to prevent the recession years of 1975-1977 from taking on an exaggerated significance, we rejected both a compilation of average rates of growth and an accumulation of positive and negative changes. These changes are instead visible as the average deviation from the starting year, 1968 = 100. Consequently, the sharp upswings up to 1973-1974 are no longer compensated for by equally violent downswings during the recession. Rather, the upswings, building 60 to 70 per cent of the data determining the average, compensate for the cyclically determined, out of proportion downswings of the recession period.

Apart from the percentages of foreign workers, which are taken from the industrial statistics, those indicators which contain absolute levels (wage levels, real balance of trade in the respective branches) are based on extrapolations from the production account of the 1970 gross domestic product.

The real gross value of production for 1968-1977 is an extrapolation from the 1970 figure for gross value of production, with the index of industrial production (A). Exports and imports as percentages of the real gross value of production for 1968-1977 are extrapolations from the exports and imports of 1970 with the corresponding indices of the volume of foreign trade. The figures derived in this way for the real value of foreign trade are expressed as percentages of the real gross value of production. The real balance of trade, expressed as a percentage of the gross value of production, is the difference between the calculated values of exports and imports. The absolute wage level for 1968-1977 corresponds to the wages per employee (including social services) for 1970, extrapolated with the help of the average earnings index (D).

The branch evaluation results in three types of rank ordering are described below.

1. Production, employment, productivity and wage costs per unit of output: "Demand" indicator

These indicators permit an initial classification of the branches' international competitiveness. The numbering of this classification expresses the rank order; ranking is primarily according to production, then to productivity.

Summary Table[a]

	Production (1)		Employment (2)		Productivity (3)		Wage costs per unit of output (4)		Wage level (5)			Percent of foreign workers (6)			Wage costs per unit of output: Export (X) + Import (M) prices (7)		Imports (M), exports (X), balance of trade (HB) in % of gross value of production (8)			Import (M) Export (X) prices (9)	
Chemicals	45.0	62.6	11.7	11.8	29.5	45.7	20.9	45.8	156.0	155.7	162.0	T 26.3	28.3	29.0	X 11.7	24.9	M 31.2	33.5	32.9	M 11.1	23.2
																	X 53.2	57.1	62.0		
												N 27.9	29.0	39.5	M 8.5	18.1	HB 22.0	23.6	29.1	X 7.6	16.7
Leather, rubber, plastics (excl. leather)	31.2	45.6	- 7.0	-20.9	44.0	84.5	8.7	11.4	92.0	92.7	91.5	T 37.9	39.3	36.0	X -2.0	-2.1	M 65.7	76.8	69.3	M 7.6	15.0
																	X 24.0	27.8	36.2		
			- 1.9	-14.0					(cf. Tab.5*, 5a*)			N 30.0	33.5	49.7	M 0.9	-3.2	HB-40.7	-48.9	-33.1	X 10.7	13.2
Food, beverages, tobacco	16.0	18.1	- 3.6	- 9.1	20.6	30.1	27.6	55.8	87.3	87.9	89.5	T 32.4	33.9	31.3	X 25.7	57.4	M 13.5	14.0	13.0	M 26.7	42.8
																	X 7.7	8.0	8.7		
												N 25.0	26.5	43.1	M 0.2	9.2	HB -5.8	-6.0	-4.3	X 2.3	- 0.9
Textiles	5.2	2.2	-14.1	-28.7	24.5	43.5	30.8	52.7	85.3	89.9	91.8	T 49.8	50.5	49.7	X 25.4	46.4	M 48.0	60.4	66.8	M 6.6	3.9
																	X 43.7	52.3	59.0		
												N 25.4	28.7	41.5	M 25.3	47.1	HB -4.3	-8.2	-7.8	X 4.1	4.3
Wearing apparel	3.4	5.3	15.2	-30.9	24.5	52.5	24.7	31.7	67.3	68.6	66.2	T 60.3	61.5	60.2	X 16.6	17.6	M 21.3	30.6	31.1	M 8.7	10.7
																	X 9.5	11.1	12.9		
												N 23.7	27.4	39.2	M 14.2	18.8	HB-11.8	-19.5	-23.2	X 7.5	11.9
Paper and paper goods	-1.7	-15.8	- 7.3	-15.6	5.9	-0.3	48.1	103.9	104.0	103.3	103.6	T 35.5	37.0	34.6	X 22.0	54.3	M 34.7	46.6	55.3	M 15.1	31.1
																	X 11.2	15.5	26.5		
												N 30.8	35.1	50.0	M 26.7	55.6	HB-23.5	-31.0	-28.8	X 19.6	32.2

a/ Tables 1* through 15* in the Tabular Appendix to Part IV elaborate on the information contained in this Summary Table.

Summary Table (continued)

	Production (1)		Employment (2)		Productivity (3)		Wage costs per unit of output (4)		Wage level (5)			Percent of foreign workers (6)			Wage costs per unit of output: Export (X) + Import (M) prices (7)		Imports (M), exports (X), balance of trade (HB) in % of gross value of production (8)			Import (M) Export (X) prices (9)	
Printing and publishing	7.2	- 5.0	-3.4	-11.2	10.9	7.0	38.4	89.2	106.0	102.0	105.3	T 21.9	22.9	21.8	X 22.7	58.6	M 10.3	11.5	13.5	M 26.9	50.1
																	X 6.8	8.9	11.1		
												N 41.5	45.3	59.8	M 7.3	26.1	HB - 3.5	- 2.5	- 2.4	X 11.6	19.3
Metals	14.8	4.0	-0.5	-10.5	16.3	16.6	38.1	70.8	102.7	103.2	100.0	T 37.7	38.8	35.7	X 17.1	31.1	M 21.0	21.6	22.3	M 24.4	33.7
																	X 12.1	12.7	20.5		
												N 30.5	33.4	49.3	M 14.8	32.4	HB - 8.9	- 8.9	- 1.8	X 18.5	30.1
Machinery and equipment	22.9	19.5	-2.5	-10.3	26.4	33.2	21.3	52.2	106.7	103.2	105.9	T 33.5	34.4	32.1	X -7.2	-6.7	M 28.2	31.5	30.2	M 18.6	32.4
																	X 36.0	35.2	42.0		
												N 36.5	40.2	55.5	M 1.6	15.0	HB 7.8	3.7	11.8	X 31.1	63.0
Watches, jewelry, engraving	9.0	2.2	-7.5	-23.8	19.2	34.3	23.0	43.8	93.3	85.9	87.9	T 27.8	30.6	27.5	X -2.4	-6.3	M 2.5	3.1	3.7	M 30.6	52.9
																	X 45.7	41.9	39.4		
												N 31.1	33.8	51.5	M -5.0	-5.9	HB 41.2	38.8	35.7	X 26.7	53.4
Only watches			-7.7	-24.7																	
Wood, cork	16.5	9.6	-6.7	-20.4	25.8	37.9	21.6	44.2	85.3	85.9	83.3	T 33.1	34.5	30.4	X 3.0	9.8	M 16.0	19.1	19.3	M 18.3	25.5
																	X 3.4	3.9	6.9		
												N 31.4	34.9	51 0	M 2.4	15.0	HB -12.6	-15.6	-12.4	X 17.8	31.3
Non-metallic min. prod. excl. petroleum + coal	11.9	-12.8	-9.1	-22.5	22.7	12.8	30.7	84.4	109.3	111.3	111.5	T 45.7	47.9	39.7	X 5.0	27.1	M 22.3	25.8	32.7	M 17.3	26.6
																	X 5.4	4.9	8.7		
												N 25.0	25.8	46.6	M 10.1	45.8	HB -16.9	-20.8	-24.0	X 19.1	34.6
Manufacturing total	18.8	16.2	-4.4	-13.9	24.8	35.1	23.1	49.7	100.0	100.0	100.0	T 35.7	36.9	34.3	X 2.4	8.9	M 25.5	28.7	29.9	M 19.4	34.2
																	X 26.3	27.6	33.7		
												N 30.7	33.9	48.9	M 2.6	11.6	HB 0.8	- 1.2	3.8	X 19.6	37.6

a/ cf. legend on the following page.

Legend to the columns of the Summary Table[1/]

(1) - (4), (7) and (9)	Average deviation of indices from 1968 = 100. First figure given: 1968-1977 Second figure given: 1975-1977
(5)	Wage level of the respective branches as a percentage of the average of 1968, 1973, 1976 (first, second and third figures, respectively).
(6)	Total of foreign workers (T) as a percentage of the branch, averages of 1968-1977, 1972-1974, 1975-1976 (first, second and third figures, respectively). Numbers of "resident" foreign workers (N) are given as a percentage of all foreign workers employed in the branch and refer to the same averages as the totals.
(8)	Averages of 1968-1970, 1971-1973, 1974-1977 (first, second and third figures, respectively).

The terms used as table headings are defined as follows:

A: Production = index of industrial production

B: Employment = index of industrial employment

C: Productivity = $\frac{A \times 100}{B}$ (Index)

D: Average earnings = index of average earnings of all employees

E: Wage costs = $\frac{B \times D}{100}$ (Index)

F: Wage costs per unit of output = $\frac{E \times 100}{A}$ (Index)

G: Export and import prices = the corresponding indices from foreign trade statistics

H: Ratio of wage costs per unit of output to foreign trade prices =

$$= \frac{F \times 100}{G} \text{ (Index)}$$

1968 = 100 forms the base figure for indicators A - H.

1/ For discussions of the methodology used to calculate these figures, the reader is referred to Prader's working papers.

(i) Above-average increase in production and productivity or below-average changes in wage costs per unit of output, respectively;

(ii) Below-average increase in production but above-average increase in productivity or below-average changes in wage costs per unit of output, respectively. Employment is below average;

(iii) Below-average development of production and productivity with corresponding above average increase in wage costs per unit of output.

The fact that more than half of the branches fall into category three illustrates the significance of the recession and the need for further differentiation, mainly in the areas of prices and foreign trade.

2. Foreign worker percentages, wage levels and employment index: "Qualification" indicator

We analyze six different classifications. Once again the numbers are to be interpreted as a hierarchical rank order. The ranking is primarily according to wage level, then to share of foreign workers.

(i) Below-average share of total foreign workers, above-average percentage of "resident" foreign workers and above-average wage level. Employment is above or below average;

(ii) Below-average share of total foreign workers and also of "resident" foreign workers. Wage level and employment lie above the average;

(iii) Above-average share of total foreign workers, below-average percentage of "residents". The wage level lies above the mean. Employment is above or below average;

(iv) Below-average share of total foreign workers, above-average percentage of "residents". Wage level and employment lie under the mean;

(v) Below-average share of foreign workers, both for the total and for the "residents", as well as below-average wage level. Employment lies above the mean;

(vi) Above-average share of total foreign workers, below-average share of "residents", as well as below-average wage level and employment.

3. Index of wage costs per unit of output and foreign trade prices, changes in the balance of trade: "Price-cost-trade" indicator

At this third level we summarize the relationships between wage costs per unit of output, foreign trade prices and real balance of trade. The ranking is primarily according to the balance of trade, in second lieu according to the foreign trade prices. This gives us a rank ordering of six groups:

(i) Improvement in the balance of trade, an increase in export prices higher than that of import prices, ratio between wage costs per unit of output and foreign trade prices below average;

(ii) Improvement in the balance of trade, increase in export prices lower than that of import prices, ratio between wage costs per unit of output and foreign trade prices above average;

(iii) Improvement in balance of trade, increase in export prices lower than that of import prices, ratio between wage costs per unit of output and foreign trade prices above average but only in relation to the export prices (a sub-category of ii);

(iv) Deteriorating balance of trade, increase in the prices of exports higher than that of import prices, ratio between wage costs per unit of output and foreign trade prices above average;

(v) Deteriorating balance of trade, increase in export prices lower than that of import prices, ratio between wage costs per unit of output and foreign trade prices below average;

(vi) Deteriorating balance of trade, increase in prices of exports lower than that of import prices, ratio between wage costs per unit of output and foreign trade prices above average.

With the help of these three groups of indicators we can now identify four groups of industrial branches. Using the data presented in the Summary Table, the branches will be described individually.

Preliminary classification of branches[1]		"Demand" (1.3.1)	"Qualification" (1.3.2)	"Price-cost-trade" (1.3.3)
	Group I			
1.1	Chemicals	1	2+	2
1.2	Rubber, plastics	1	3+	1
1.3	Machinery and equipment	1	1+	1
	Group II			
2.1	Printing and publishing	3	1+	2
2.2	Metals	3	3+	2
2.3	Wood, cork	2	4-	3
2.4	Food, beverages, tobacco	3	5+	3
	Group III			
3.1	Non-metallic mineral products except petroleum and coal	3	3-	4
3.2	Watches	3	4-	5
3.3	Paper and paper products	3	1-	4
	Group IV			
4.1	Textiles	3	6-	6
4.2	Wearing apparel	3	6-	6

B. Rubber and Plastics

Although it was not possible to exclude leather from this branch in the preparation of the data (except in columns (6) and (8) of the Summary Table), the following is for the most limited to rubber and plastics. On the one hand, employment in the leather branch is receding; on the other hand, it accounts for only a relatively insignificant part of the branch (15.4 per cent of employees). Hence, the picture given in the Summary Table may be attributed primarily to developments in rubber and plastics.

From the aspect of the "demand" indicators, the branch shows a strong upward movement. The recession has not only had a minor impact but this branch has already shown above-average recovery. However, productivity and

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1/ (+) indicates above-average employment; (-), below-average employment. This additional criterion is here made explicitly visible because later we want to interpret redeployment primarily in terms of its consequences for the labour market.

wage costs per unit of output may be somewhat over- respectively under-represented in the Summary Table because of depressed development in the leather industry.

In the case of the "qualifications" indicators the branch's position is more ambiguous. The wage level and total foreign worker percentages suggest a relatively low qualification level of the labour force. However, the wage level given in the Summary Table is somewhat too low (see also Tables 5* and 5a* in the Appendix), since it includes the leather industry. Moreover, the percentage of resident foreign workers lies near the mean. If one tries to weigh these partially contradictory tendencies against one another, the conclusion that the quality of manpower required is average to below average may be realistic.[1] A better basis for evaluating the performance of the branch is provided by its high capital intensity.

From the aspect of the "price-cost-trade" indicators, the branch looks very good. Not only was it able to make up for the increase in wage costs per unit of output by higher export prices, but its real balance of trade is increasing as a percentage of the gross value of production, although the rises in import prices remain behind those of exports. This may indicate that the structure of production is changing in the direction of qualitatively higher value products in comparison to foreign competition. Nevertheless, the absolute trade balance is still negative. The proportion of plastics imported from low-wage countries is small, but it has increased significantly, mainly in the areas of rubber and finished plastic goods.[2]

As a result of this analysis two hypotheses concerning the redeployment issue can be made:

- The redeployment of industrial production as a consequence of cost considerations does not appear to be a particularly pressing issue at the moment. The pressure of competing imports is small, although greater in consumer-related areas. In leather, which forms an exception, there has been a massive increase in competition from imports coming from low-wage countries, and this is already accounting for an above-average share of Switzerland's leather imports.

1/ This is reconfirmed by the studies of Kneschaurek and the Centre for Economic Research in Zurich.

2/ H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsberich, No. 8, 1977.

- If redeployment of industrial production does take place, it is more geared to opening new markets Such redeployment is not an expression of difficulties stemming from Switzerland's competitive position, but rather results from the above-average expansion of this branch. Nevertheless, there could be certain barriers which result from the capital intensity and the still close to average qualifications required of the personnel. Redeployment may, in accordance with Hollenstein's findings, be concentrated on products which are already quite far advanced in the production cycle.

C. Chemicals

If we consider the "demand" indicators (production, employment, productivity, wage costs per unit of output), we find confirmation of the expansion of the branch. The chemical industry is the sole branch in the industrial sector which is increasing employment. Moreover, this is not occurring at the expense of productivity. Nevertheless, the wage costs per unit of output lie only slightly below the middle, which can be attributed to the above-average increase in wages (see Table 4* in the Appendix). "Synthetic and natural dyes" form an exception to this pattern. Here the proportion of employed drops sharply.

From the point of view of the wage level, the qualifications requirements of the labour force are very high.[1/] The below-average percentage of total foreign workers complements the picture, as we would expect. The fact that the percentage of resident foreign workers lies under the mean is a sign of the chemical industry's reliance on better educated Swiss labour; still more important, however, in view of the strong geographical concentration on the border city of Basel, are the foreign workers who commute daily across the border from France and the Federal Republic of Germany. In addition to these employment characteristics, the capital intensity of the chemical industry is also a factor favouring a Swiss location.

Inspection of the "price-cost-trade" indicators shows that the chemical industry has a good record in its real foreign trade balance. However, given the relationship between wage costs per unit of output and foreign trade

1/ This is also confirmed by studies of Kneschaurek, the Centre for Economic Research in Zurich, and the Swiss Federation of Commerce and Industry (see Appendix to Part III).

prices, a certain cost pressure cannot be denied, even if this pressure is neutralized by qualitative advantages.

The decline in employment, in the line of "synthetic and natural dyes", together with studies by Hollenstein and Birchler, serve to differentiate adequately branch totals.[1/] Birchler shows that the market shares of Swiss exporters are strongest in the fields of chemical raw materials and components, and have receded in the area of dyestuffs. According to Hollenstein, the proportion of imports from low-wage countries has risen sharply in the areas of pharmaceutics/cosmetics, wax goods and matches, even if they remain below average. A 1976 survey of Swiss firms reveals an above-average interest on the part of the chemical industry in redeployment, with the motive of high costs (rate of exchange, wages) appearing only secondary to the motive of access to markets.[2/] The Maillat study also mentioned access to markets as the most important motive for industrial redeployment.[3/]

The following conclusions emerge:

- The chemical industry is practising redeployment and is strongly interested in it for those products which present no prohibitively high requirements in the qualification of the labour force. The products identified permit one to suspect that it is primarily a question of standardized commodities far advanced in the production cycle;
- Redeployment occurs in the chemical industry not primarily because of cost considerations but because of concern for market access; hence, redeployment is the outcome of the expansionary and financial strength of the chemical industry and less a consequence of the disadvantages of producing inside Switzerland.

D. Machinery

Both in terms of employment and value added, the machinery industry is the most important and, at the same time, the least homogeneous branch. Consequently, statistical problems become all the more important when attempting a further disaggregation.

1/ See Appendix to Part III.

2/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Paper on Structural Changes No. 7, May 1979.

3/ P. Maillat, Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales - le cas de la Suisse, International Labour Organization, Geneva, 1977 (especially Volume III which contains the results of a questionnaire).

The indicators introduced for consideration of "demand" show that the machine industry lies barely above the industrial mean. This is true for production, employment, productivity and wage costs per unit of output. In all four cases its situation is worse than the branches already discussed. The rise in the proportion of employed holds good for all parts of the branch except the transportation sector. The qualification indicators of wage level and foreign worker percentages indicate as a whole a highly-qualified structure of skilled labour. This is confirmed in the investigations by Kneschaurek, the Swiss Federation of Commerce and Industry and the Centre for Economic Research in Zurich.[1/] However, the latter shows that household machines and appliances are an exception.

If we examine the price-cost-trade indicators, the hypothesis seems to be borne out that a relatively poor position (in comparison to the chemicals industry) in productivity and wage costs per unit of output can be compensated for by innovative technological advantages and rises in the prices of exports. The machine industry has not only succeeded in strongly improving its real balance of trade as a percentage of the gross value of production (the decline during 1971-1973 may be attributed to the high home demand), but also in keeping up with the growth in wage costs per unit of output by significant rises in the price of exports. All this took place with only a minor setback in output and in spite of the pressure exercised by comparatively low import prices.

Birchler's investigation[2/] shows that the machine industry did not have to put up with relevant market losses in its share of the export markets of the fifteen OECD countries in any of its important branches (except perhaps in the case of generators, where political factors came into play). Rather its shares in the market were still able to rise.

Conversely, Hollenstein's study[3/] indicates areas in which low-wage countries succeeded in raising to a significant extent their share of Switzerland's imports (bicycles and motorcycles, diverse transport equipment, diverse electrical equipment, office equipment, optics, precision tools, maintenance electronics). The analysis of these areas suggests that here, too, it is a question of products the production cycle of which is far advanced and the production of which no longer demands high labour qualification. Correspon-

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1/ See Appendix to Part III.

2/ See Appendix to Part III.

3/ See Appendix to Part III.

ding to the results of the UNIDO survey,[1] the interest in redeployment is definitely above average. The major incentive is once again access to markets rather than cost considerations (rate of exchange, wages). It is interesting that the lack of qualifications of potential employees is viewed as the greatest obstacle to redeployment. The Maillat study came to the same conclusion about redeployment motives.[2]

Thus, the situation of the machine industry is similar to that of the chemical industry. Areas of the machine industry where the quality of the labour force no longer plays an overwhelming role are liable to lose ground to import competition. Redeployment is a viable alternative.

E. Metals

The demand indicators relegate the metal industry to those branches which have not attained the average level of industrial development. Wage costs per unit of output and employment are above average, production and productivity below the mean.

The "qualifications" indicators which should provide information about the qualitative requirements, yield a diffuse picture: above-average wage rates, on the one hand; a high proportion of foreign workers, on the other. The work of the Centre for Economic Research, Zurich, here permits a welcome differentiation:

- Parts of the fabricated metal goods industry with low capital intensity (wire goods and the like, cable works, metal insulation, cutlery, tin products and light fittings) and the basic metal industry with high capital intensity (except light metals) make low demand on the qualifications of the labour force;
- The branches of the metal goods industry which produce machine and die tools, light metals goods, light bulbs, metal furniture, and those branches which produce light metals and semi-finished light metal goods, have high requirements for qualified labour and are characterized by high capital intensity.

1/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Paper on Structural Changes No. 7, May 1979.

2/ P. Maillat, Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales - le cas de la Suisse, International Labour Organization, Geneva, 1977 (especially Volume III which contains the results of a questionnaire).

The branches of the metal industry showing high demand for qualified labour and/or a high capital intensity employed a mere 30 per cent of those working in metals during the period under observation. That these branches perform above the average for the metal industry as a whole may be inferred but not unambiguously proved.

Interestingly, the below- respectively above-average development in the area of productivity and wage costs per unit of output does not show through in foreign trade. Rather, the real balance of trade has improved, but only with depressed export prices in relation to import prices. While the high import prices reveal a certain degree of protection on the home market, the low export prices may be a sign that price competition in export markets is becoming fiercer. For example, the construction-related sectors of the metal industry were driven to export in the short term even to the point of selling off their stock without taking profits into account. The cost pressure resulting from growing low-wage country imports may be the most severe for cutlery and tin goods.[1/]

The following hypotheses about redeployment may be formulated for the metal industry as a whole:

- Somewhat less than one-third of the branch requires qualified labour and/or high capital intensity and is primarily redeploying in order to expand on foreign markets rather than to reduce high costs of production. This third may statistically disquise the cost pressure in other sub-branches;
- The sub-branches most affected by import competition are those which show neither high demands for qualified labour nor above-average capital intensity.[2/]

F. Printing and Publishing

Like the majority of branches investigated, printing and publishing does not attain the industrial average for the demand indicators. Production and productivity occur at a level unambiguously below the industrial mean and wage costs per unit of output are olearly above the industrial mean. This

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1/ H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETHMonatsbericht, No. 8, 1977.

2/ Ibid.

statement may be subject to a certain modification in the long-run because of the extraordinary impact which the recession had on this branch. In addition, examination of the sub-branches shows that the increase in the proportion of employed is to be explained in the first instance by developments in the areas of lithography, offset, and photo-engraving, whereas employment in book and newspaper printing has remained constant.

The "qualifications" indicators (wage level, proportion of foreign workers) indicate high labour force qualification requirements.[1/]

The investigation of "price-cost-trade" indicators shows that the printing and publishing industry is strongly oriented toward domestic sales. In spite of this, it has succeeded in coping with the lack of demand inside Switzerland by significantly increasingly its share of exports as a percentage of the gross value of production. Import prices, which have risen considerably in comparison to export prices, may provide a certain explanation for this, while at the same time indicating the fact that import competition does not present too great a threat. Conversely, Birchler[2/] has shown that the proportion of Swiss print products on the import markets of the fifteen OECD countries has severely declined during the recession.

This rather sparse information allows us to make two hypotheses:

- In printing and publishing, the problem of cost pressure is great. This is shown by the ratio between wage costs per unit of output and foreign trade prices. In spite of this, competition from imports does not present such a severe problem. Moreover, foreign competition is favourably offset by the high quality of Swiss products;
- The home market orientation of the branch and the high labour qualification requirements make a strategy of further qualitative specialization more probable than an active redeployment strategy.

G. Wood and Cork

Wood and cork is the only branch to have sucoeeded in achieving an above-average level of productivity and a below-average rise in wage costs per unit

1/ The studies by Kneschaurek and the Centre for Economic Research, Zurich, yielded similar findings. See Appendix to Part III.

2/ U. Birchler and H. Würgler, Die Konjunkturentwicklung wichtiger Auslandsmärkte und die Reaktionen ausgewählter Branchen der Exportwirtschaft, WIF/ETH, Monatsbericht No. 2, 1978.

of output by severely reducing its labour force. This has occurred despite the fact that total output is below average. Wood and cork is one of the branches which over the last ten years have undergone severe rationalization, restructuring and specialization. In turn, this may indicate further growth in capital intensity, though most likely not in all sub-branches.

An examination of the "qualifications" perspective (wage level and proportion of foreign workers) yields a contradictory picture. The wage level remains below average and so too does the total proportion of foreign workers. The Centre for Economic Research, Zurich, found that there is a below-average level of labour qualifications; however, if we take into account Kneschaurek's findings, it appears that the proportion of highly qualified staff personnel in the branch is indeed small, but that the professional qualifications of the workers are high.[1/] So we are inclined to infer at least average qualitative requirements for the labour force, and thus attribute the low level of wages to the severe reduction in employment.

The analysis of the "price-cost-trade" indicators reveals that the wood and cork industry has been able to maintain its real balance of trade as a percentage of the gross value of production, while the development of foreign trade prices has almost compensated for the rise in wage costs per unit of output. The cost pressure exercised by competition from imports, therefore, does not appear to be too severe. Our analysis finds indirect confirmation in Hollenstein's investigation.[2/] As a proportion of the total wood imports to Switzerland, imports from low-wage countries have declined. This is especially true for the sub-group of wood products, while the proportions of toys, wood furniture, as well as basket and cork goods have risen. The proportion in the sub-branch wood preparation is stagnating. In all these areas the low-wage countries have maintained a share of Swiss imports that lies above the industrial average.

The following hypotheses seem appropriate:

- Developments inside Switzerland and in foreign trade show that, caught up in a process of contraction and specialization, the wood and cork industry is disposing of sub-branches in which import competition has already been exercizing pressure for some time (i.e., sub-branches in which the portion of imports from low-wage countries lie above the industrial average).

1/ See Appendix to Part III.

2/ See Appendix to Part III.

Productivity figures and the real balance of trade demonstrate that this has been relatively successful;

- The areas in which the low-wage countries are strong in imports may in principle present possibility and pressures for redeployment. However, the home market orientation of the wood and cork industry does not indicate an especially strong tendency in this direction.[1]

H. Food, Beverages and Tobacco

It is hard to assess the food, beverages and tobacco industry because its foreign trade is strongly regulated both directly and indirectly (raw materials for food products) by the Government. An examination of the "demand" indicators reveals that this branch does not reach the industrial mean. Production and productivity are below average, employment and wage costs per unit of output above average. However, the deviation from the mean is relatively small, and production has recovered well from the recession (though not least as a consequence of a certain import protection and the fact that the branch is strongly consumption-related).

The wage level indicates a below-average level of qualifications requirements, while the proportion of foreign workers lies a little under the average. Kneschaurek and the Centre for Economic Research, Zurich, found qualifications requirements are average to below average.[2] The capital intensity of the branch is, as a whole, above average. Here the study by the Centre for Economic Research, Zurich, permits some interesting disaggregation:[3]

- The production of meat, grain products, and cocoa/chocolate/sugar goods is less capital intensive;
- The production of tinned foods, milk products, oils, fats and animal feed involves capital-intensive production processes.

The "price-cost-trade" indicators show that this branch has been able to increase its real balance of trade as a percentage of gross value of production. We cannot ascertain, however, to what extent protectionism is responsible for this increase. Nevertheless, the extraordinary rises in import prices in

1/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Paper on Structural Changes No. 7, May 1979.

2/ Kneschaurek and the Centre for Economic Research, Zurich.

3/ The Centre for Economic Research, Zurich, Konjunktur, Analysen und Prognosen, Monatsberichte des Institutes für Wirtschaftsforschung, ETHZ, various editions.

comparison to export prices is an indication of a price protection against the onslaught of foreign competition on the home market. Conversely, the depressed export prices indicate a strong cost pressure and a competitive price struggle in other countries.[1/]

- The proportion of Swiss exports on the import markets in the fifteen OECD countries has increased in the areas of "miscellaneous foodstuffs" (predominantly capital intensive) and decreased in foodstuffs for daily needs and in chocolate (predominantly less capital intensive).
- The low-wage countries' import share of foodstuffs is - despite fluctuations - increasing as a whole. This is true mainly for the sub-branches of meat, tinned foods, non-alcoholic drinks, and cigars. The sub-branches of diverse foodstuffs, animal feed and wine show declining shares.

The Maillat Study III[2/] shows that the most important motives cited for redeployment of industrial production were high production costs and shortage of labour in Switzerland. These motives were followed by the desire to open new markets. This statement indicates a phenomenon especially pronounced in Switzerland: industries with low wage levels often complain of the labour shortage, i.e. a shortage of cheap labour. To the extent that this also applies to certain capital intensive forms of production, redeployment of capital-intensive/low-wage production processes can be expected.

The conclusions, which can be deduced in the form of hypotheses, are as follows:

- Above all, the less capital intensive products of the food industry are suitable for industrial redeployment, though some capital-intensive products are also suitable;
- The minor involvement in other countries permits one to suspect a below-average interest in redeployment.[3/] Nevertheless, it is worth noting that the Nestlé's company has already been heavily producing and selling in other countries for a long time;

1/ Hollenstein and Birchler confirm, at least partially, our analysis.

2/ P. Maillat, Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales - le cas de la Suisse, International Labour Organization, Geneva, 1977 (especially Volume III which contains the results of a questionnaire).

3/ cf. Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Paper on Structural Changes No. 7, May 1979.

- Birchler's and Hollenstein's studies show that apart from industrial redeployment, specialization remains a thoroughly possible and sensible strategy.[1] This is all the more true since the production of non-specialized foodstuffs takes place in most countries. This fact is also one of the most important reasons for not redeploying production.[2]

I. The Watch Industry

The two studies of the watch industry[3] which have appeared recently discuss at length the problems of this branch. These include:

- Difficulties of adjustment to new technological development;
- Production on too small a scale and inadequate marketing;
- A dispersed horizontal and vertical branch structure;
- Loss of markets for components and sharp competition from assembly plants in low-wage countries.

These problems manifest themselves especially in the low and medium price range, whereas the producers of luxury watches have been less affected.

By and large, analysis of the indicators confirms the picture already presented. Below average production and productivity go hand in hand with a sharp decline in employment. That the development in wage costs per unit of output corresponds to the industrial average can only be explained by an acceptance of low wages in the face of the ever-growing threats of unemployment which predominate in the branch (cf. Tables 4*, 5* and 5a* in the Appendix to Part IV). The wage level is, therefore, not exclusively an expression of low qualifications requirements, but primarily a consequence of out-dated qualifications and of the difficulties of the branch.

1/ U. Birchler and H. Würgler, Die Konjunkturentwicklung wichtiger Auslandsmärkte und die Reaktionen ausgewählter Branchen der Exportwirtschaft, WIF/ETH, Monatsbericht No. 2, 1978; and H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

2/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Paper on Structural Changes No. 7, May 1979.

3/ W. Hill, Die Wettbewerbsstellung der schweizerischen Uhrenindustrie (confidential), Basel, 1977; and Fédération Horlogère Suisse (special working team), Die schweizerische Uhrenindustrie in der Sicht der nächsten zehn Jahre, 1976.

Even if the relation of wage costs per unit of output to foreign trade prices indicates that the increase in costs could be more than compensated for by a rise in prices, the development of the real balance of trade shows that the price competition in foreign markets has increased considerably as a result of the diminishing technological advantages that Swiss watches offer. Other investigations reveal a sharp decline in the market share of Swiss watches on the import markets of the fifteen OECD countries and substantial growth in the proportion of imports into Switzerland from the low-wage countries (finished clocks and watches, parts and movements).

From what has been said and from the two watch industry studies, the following consequences for the redeployment of industrial production emerge:

- The relocation of the Swiss watch industry into other countries is not particularly in the foreground;
- Instead, there is a restructuring (vertical and horizontal concentration) and a tightening of the range of products produced. Additionally, big efforts are being made in research and development to fill the existing technological gap;
- Although our analysis suggests a redeployment of production in the area of traditional watch technology (the continued export of components to low-wage countries points in this direction), it is precisely the small-scale organization of the branch which seems to impede an intensified application of such a strategy. The few large integrated producers form, however, an exception.

J. Non-metallic Mineral Products except Petroleum and Coal

The branch was heavily affected by the collapse of the construction sector during the recession. This becomes very clear from a comparison of the average values of demand indicators for 1968-1977 with those for 1975-1977. (See production, employment, productivity and wage costs per unit of output figures in the Summary Table.)

The estimation of qualifications requirements of the labour force by means of the wage level and the proportion of foreign workers is difficult because the branch is characterized by the past boom and ever since the Second World War a traditionally above-average proportion of foreign workers and low

qualifications requirements.[1] On the other hand, apart from the areas of industrial and construction ceramics, capital intensity is above average.

The "price-cost-trade" indicators reveal that the real balance of trade as a percentage of the gross value of production has deteriorated. At the same time foreign trade prices (also in comparison to the wage costs per unit of output) reveal considerable cost pressures and competition from imports.[2] Imports from low-wage countries as a proportion of Swiss imports have markedly increased, mainly in the areas of glass products and ceramics.

The following hypothesis about redeployment seems appropriate:

- In spite of cost pressures, there seems to be little redeployment out of cost considerations. Since most of the branch's products have a very low value-weight ratio, the cost pressure may be better explained as a result of excess capacity inside Switzerland (even in the medium-run) rather than as a result of fierce import competition. Concern for access to markets, on the other hand, may induce redeployment. Glass products and ceramics (as other internationally tradable goods with similar characteristics) continue to be exceptions. However, their importance in the branch is small.

K. Textiles and Wearing Apparel

Both branches have been involved for a long time in a process of restructuring. Massive reduction in employment has allowed the maintenance of average productivity in spite of a level of production that lies far below average. However, the wage costs per unit of output remain above the mean. This is to be explained in the case of the textile industry by the above-average rise in wage rates due to shortage of cheap labour. Nevertheless, wages still lie below the mean (cf. Table 4* in the Appendix to Part IV). In the case of wearing apparel, the growth in wage rates is average, reflecting a proportion of foreign workers of over 60 per cent.

The wage level and the proportion of foreign workers allow us to infer low worker qualifications.[3] Apart from food and wood, the wage level is by the lowest. The proportion of foreign workers is extraordinarily high and the

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1/ Kneschaurek and the Centre for Economic Research, Zurich.

2/ Cf. Hollenstein.

3/ Cf. Kneschaurek, Centre for Economic Research, Zurich.

proportion of resident foreign workers far beneath the average. In addition, both branches are still low in capital intensity, despite the sharply divergent development of production and employment which indicates a rise in capital intensity (cf. Tables 1* and 2* in the Appendix to Part IV).

Real balance of trade as a percentage of gross value of production shows a sharp deterioration in both branches. Foreign trade prices were not able to provide either branch with any compensation. The cost pressure, as it is expressed in the relation of wage costs per unit of output to foreign trade prices, is correspondingly high. This leads one to suspect that the competitive position of both wearing apparel and textiles can only be maintained in a few high-quality specialities (i.e. fashion). In the field of mass goods, Swiss products are facing brutal price competition; indicators show that room for manoeuvre is getting smaller.

An examination of the market proportion of the Swiss export industry in the import markets of the fifteen OECD countries shows that both branches are indeed being affected by stiff competition. Synthetic fabrics are the only exception. Most sub-branches reveal an above-average share of imports from low-wage countries (textiles and wearing apparel in total; in wearing apparel, all sub-branches; in textiles all sub-branches with the exception of embroidery and special fabrics). The sub-branches of synthetic fabrics and woven and knitted fabrics reveal a below-average, but heavily increasing share, of imports from low-wage countries. Cost considerations (high wage costs, labour shortage (!), i.e. shortage of cheap labour), take precedence over access to markets as the most important motive for the redeployment of production.[1/]

The following may serve as viable hypotheses:

- Practically all lines of production in both branches are suited to redeployment in so far as it is not a question of special-quality products. Cost pressures and price competition are massive;
- Changes in the volume produced in Switzerland suggest that redeployment has been occurring for a long time, perhaps disguised as passive redeployment. Given the potential of low-wage countries in textiles and wearing apparel, which strategy makes sense for Swiss industry: specializing in high-quality, high-standing, expensive and fashionable products, redeployment of production, or both?

1/ Cf. Maillat and Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO.

- The financial situation of many, primarily smaller and medium-sized, firms may, however, set limits to risky redeployment strategies.

L. Paper and Paper Products

Output in the paper industry has not only suffered an extraordinary setback during the recession (this phenomenon can be seen worldwide), but already before the recession the paper industry in Switzerland demonstrated only a gradual expansion, an expansion very subject to fluctuations (see Tables 1*, 2*, 7* in Appendix to Part IV). Despite an above-average decline in employment, the productivity of the branch is the lowest in Switzerland, while wage costs per unit of output are the highest.

The wage level suggests high worker qualifications, but other studies contradict this; moreover, whereas the table in III.2.2 indicates a below-average capital intensity, the other studies draw the opposite conclusion.[1/] One possible explanation for this may simply be the effects of dividing the branch into cellulose (insignificant in Switzerland), paper and cardboard production, and producers of other paper goods. The former are, in contrast to the latter, capital intensive and demand lower qualifications from the labour force.

Changes in the real balance of trade as a percentage of the gross value of production are highly unfavourable to the entire branch. This is only slightly compensated for by export prices rising above import prices. Cost pressure (ratio between wage costs per unit of output and foreign trade prices) remains very high. One investigation[2/] shows low-wage countries acquiring a strongly increasing share in Switzerland's paper imports.

The following conclusions seem tenable:

- From the point of view of cost pressures, redeployment of production is a very real issue for the paper industry;
- However, an examination of the large paper producers shows that, apart from wage costs, the availability of raw materials and energy resources are among the branch's most important locational concerns. (This is at least true for the areas of cellulose, paper and cardboard.)

1/ Kneschaurek and the Centre for Economic Research, Zurich.

2/ Hollenstein, H., Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

- Worldwide over-capacities in the area of mass paper production may force the Swiss industry into specializing in high-value paper products.

M. Summary

Apart from providing an abundance of additional items of information, the detailed examination undertaken above has not contradicted our general assessment of the competitive situation of Swiss manufacturing. Due to expansion of volume and foreign trade, the three branches chemicals, rubber and plastics, and machinery may be taken definitely as having achieved, in comparison to the development of manufacturing as a whole, the greatest rise of competitive ability. On the basis of the information currently available, we cannot say, however, which of the three is most competitive. More precise investigations are needed to identify which individual indicators are most significant for determining overall competitive ability. This is likewise true for the branches of the second group (printing and publishing; metals; food, beverages, tobacco), the third (watches; non-metallic mineral products; paper and paper products) and finally the fourth group (textiles and wearing apparel).

Which industry belongs to which group seems clear:

First group: strong expansionary power and success in foreign trade, favourable costs situation;

Second group: medium power of expansion of high-quality production, success in foreign trade, a still "tolerable" cost situation;

Third group: little power of expansion, no success in foreign trade, unfavourable cost situation, or left out in the race for technological innovations;

Fourth group: extreme version of the third.

V. REDEPLOYMENT[1] OF SWISS INDUSTRY TO DEVELOPING COUNTRIES

In this Part, we move from analyses of world trade and of Swiss industrial branches to a direct discussion of active redeployment of Swiss industry to the developing countries. By active redeployment we mean transfer of production into the developing countries by the Swiss firms themselves or at least under their auspices.

General Overview of Capital Redeployment to the Developing Countries

Bickel[2] mentions that the resettlement of production by Swiss industrial firms in other countries already occurred in the nineteenth century: "The first direct investments in other countries were by the textile industry, initially in Southern Germany, but also in other neighbouring countries." Another example which he cites is the shoe industry, in particular the Bally firm, which took the step "already in the 1870's of establishing several branches overseas, at first in South America". Bickel detects the motive for these early relocations of production in the sales-orientation (tariff limits, etc.). In the case of the first Bally branch founded in South America, however, it was a question of a relocation for easier access to raw materials, i.e., the La Federal tannery in Argentina.

Berweger[3] confirms that the beginnings of Switzerland's "industrial resettlement" can be traced back before the First World War. He sees a certain acceleration during the period between 1924 and 1930, in which

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1/ In this report the term redeployment is used to indicate relocation of production to any foreign country, not simply to developing countries. In this sense the use of the term does not conform exactly to the official UNIDO definition. "Active" redeployment refers to firms that redeploy out of market and/or cost considerations. "Passive" redeployment refers to firms that are forced out of the market by import competition, without being able to compensate by active redeployment.

2/ W. Bickel. Die Volkswirtschaft der Schweiz. Aarau/Frankfurt a.M., 1973.

3/ G. Berweger. Investition und Legitimation. Privatinvestitionen in Entwicklungsländern als Teil der schweizerischen Legitimationsproblematik. Diss. St. Gallen, 1977.

some of today's developing countries also participated. In 1921, Nestlé began activity in what today is known as a developing country with the production of condensed milk in Brazil.[1/] Fifty-seven years later Nestlé has the greatest amount of production of all Swiss firms in the developing countries.

For the Swiss economy as a whole, statistics on direct private investments to the developing countries, including those in Europe, begin in 1949.

Table V.1 Development of the stock of Swiss direct private investments in the developing countries, including those in Europe (1949-1976)

Year	Amount in millions of Swiss francs
1949	550
1955	1,074
1958	1,445
1962	2,100
1968	3,454
1971	3,840
1973	3,926
1974	4,029 (Total Swiss foreign investments approximately 51 billion Swiss francs)
1975	4,645
1976	4,933

Source: Division of Commerce of the Federal Ministry of Public Economy. Up to 1973: according to Berweger; 1974-1976: according to the Society for the Promotion of Swiss Business and Industry.

The data collections of the Division of Commerce of the Swiss Federal Ministry of Public Economy are based on the concept of developing countries in the broader sense (described in Part II), but including, in addition, Spain, Portugal, Greece and Turkey. The investment data include investments (Equity and loan) in subsidiaries, as well as portfolio and other capital investments.

In a cross-national comparison of the seventeen member countries of the Development Assistance Committee of the OECD (DAC), Switzerland occupied ninth place, at the end of 1975, in terms of the absolute amount of direct private investments in the developing countries with 1.89 per cent of total investment; but second place in terms of per capita (with $224) behind the Netherlands ($238) and in front of the United States ($193) and the United Kingdom ($154, or $189, if oil is included).

There are no statistical data and cross-national comparisons available for the industrial sector alone, but according to the estimates cited by Berweger, manufacturing's share of total Swiss investments in the developing countries is far higher than the share for the DAC countries as a whole; 75 per cent (according to Etienne[1]) or 55 per cent (according to Strahm[2]), as opposed to only 31 per cent for the DAC countries as a whole. Swiss manufacturing industry probably takes first place in an international comparison of DAC countries for per capita investment in the developing countries even ahead of the Netherlands.

From 1967 onwards, estimates are available for personnel in Swiss firms of all sectors in the developing countries.

Table V.2 Increase of personnel of Swiss firms in the developing countries, including Europe (1967-1977)

Year	Personnel	Percentage increase
1967	86,790	
1971	100,700	
1972	104,300	+ 3.6
1973	112,300	+ 7.7
1974	120,700	+ 7.5
1975	126,073	+ 4.5
1976	130,266	+ 3.3
1977	143,183	+ 9.9

Sources: For 1967, Etienne, according to Berweger. For 1971 ff., Division of Commerce of the Federal Ministry of Public Economy; up to 1976 according to Entwicklung-Développement.

1/ Berwegen, G., Investition und Legitimation, Privatinvestitionen in Entwicklungsländern als Teil der schweizerischen Legitimationsproblematik, Diss., St. Gallen, 1977.

2/ Ibid.

1976 provides a good base-line for figuring the personnel of Swiss industrial firms in the developing countries (including Europe). According to a press statement, the member-firms of the Association of Swiss Industrial Holding Companies (Industrie-Holding) employed 106,000 people in the developing countries (including Europe). The total number of personnel employed in subsidiary firms in other countries - both developed and underdeveloped - was 441,000. Total personnel in Switzerland for member-firms was 127,000. The method for calculating the number of employees in the developing countries corresponds to that of the Division of Commerce of the Federal Ministry of Public Economy. For those employed in the developing countries by industrial firms which are not members of the Industrial-holding group, we reckon an additional 7 to 10%. This results in a cautious estimate of total personnel of Swiss industry in the developing countries, including Europe, of about 113,000-117,000. For the year 1976, this amounts to about a sixth of those employed in industry in Switzerland (683,200). Furthermore, it amounts to a good fifth of the estimated total number - 500,000 - of industrial employees in Swiss firms abroad.1/

From a global point of view, the firms established in the developing countries are a significant factor for Swiss industry. This significance is, of course, still greater for the big leading concerns. For the member firms of the Industrie-Holding, for example, the number of employees in the developing countries constitute over 80% of those employed in Switzerland, and at the same time constitute 24% of the total number of employees overseas.

As the following table shows, direct private investment in the developing countries for all economic sectors has, since the beginning of data collection in 1949, been concentrated on Latin America.

1/ Cf. Working paper of K. Ulmi.

Table V.3 Distribution of Switzerland's direct private investments in the developing countries by continent

	1949		1971		1976	
	Million francs	Per cent	Million francs	Per cent	Million francs	Per cent
Europe	105	19	584	15.2	999	20.3
Africa	55	10	363	9.5	485	9.8
Latin America	285	52	2,448	63.7	2,873	58.3
Asia	105	19	445	11.6	575	11.6
Total	550	100	3,840	100.0	4,932	100.0
Total developing countries outside Europe	445	81	3,256	84.8	3,933	79.7

Sources: For 1949, Berweger; for 1971/1976, Division of Commerce of the Federal Ministry of Public Economy according to the Society for the Promotion of Swiss Business and Industry.

Over the years Latin America has increased its share at the expense of Asia. If we isolate the share of investments made in the developing countries, excluding Europe, Latin America's predominance is still more pronounced: almost three quarters (73 per cent) in 1976.

The percentages of net flows of indirect private investments to the developing countries from 1972 to 1976 show considerable fluctuations. 1/ Nevertheless, Latin America throughout maintained its leading position.

	Minimum		Maximum	
Europe	1.3%	(1976)	- 36.3%	(1972)
Africa	1.3%	(1975)	- 21.7%	(1976)
Latin America	44.3%	(1972)	- 68.2%	(1975)
Asia	5.9%	(1975)	- 18.7%	(1973)

1/ Entwicklung-Développement. Information über Entwicklungspolitik. Ed.: Delegierter des Bundesrates für technische Zusammenarbeit. EPD and Handelsabteilung EVD, Bern, various editions.

According to data for 1968,[1] Spain's share of investments in the European developing countries amounted to 84 per cent; Brazil's, Argentina's and Mexico's share of investments in Latin America amounted to 31 per cent, 20 per cent and 19 per cent, respectively; India's share of investments in the developing countries of Asia was 33 per cent.

In accordance with expectations, the personnel of Swiss firms of all sectors in the developing countries are also concentrated in Latin America.

Table V.4 Distribution of personnel of Swiss firms in the developing countries by continent

	1967		1971		1976	
	Absolute	Per cent	Absolute	Per cent	Absolute	Per cent
Europe	14,736	17.0	16,200	16.1	23,239	17.8
Africa	7,461	8.6	7,900	7.8	12,259	9.4
Latin America	48,369	55.7	55,000	54.7	69,228	53.2
Asia	16,224	18.7	21,600	21.4	25,540	19.6
Total	86,790	100.0	100,700	100.0	130,266	100.0
Total developing countries outside Europe	72,054	83.0	84,500	83.9	107,027	82.2

Sources: 1967, Etienne, according to Berweger; 1971/1976, Division of Commerce of the Federal Ministry of Public Economy, according to Entwichlung-Développement.

Excluding Europe, Latin America's share of personnel amounts to almost two-thirds (65 per cent) of personnel in the developing countries. Asia, however, has a far higher proportion of personnel compared to its proportion of investment.

1/ G. Berweger. Investition und Legitimation. Privatinvestitionen in Entwicklungsländern als Teil der schweizerischen Legitimationsproblematik. Diss. St. Gallen, 1977.

For estimating the industrial sector's share of the 107,000 personnel in all developing countries outside Europe, the figures for the members of the Industrie-Holding once again provide a base-line: members firms have 90,000 employees in the developing countries outside Europe. We reckon an addition of from 5-8% for the remaining firms. This yields an estimate for 1976 of 95,000 - 97,000 personnel employed by Swiss industry in the developing countries outside Europe. This is almost a seventh of industrial employees working inside Switzerland.

The numbers of those employed[1/] in all economic sectors in individual countries for the year 1967 show that in Europe, Spain led with a share of 9%, in Asia, India led with 56% and in Latin America, Brazil led with 43% - followed by Argentina with 21% and Mexico with 12%. Brazil alone accounted for 29% of those employed in developing countries outside Europe. There is no comprehensive data available on the significance of the South-east Asian low-cost/high efficiency countries for Switzerland's industrial redeployment. But as a whole this group of countries has a relatively slight significance: Singapore, Malaysia, Hong Kong, the Republic of Korea and Other Asia together accounted for only 2% of those employed in the developing countries outside Europe.[2/] The proportion employed in the OPEC countries was only 3%. The proportion of personnel in the developing countries employed in the least developed countries is only 0.3 per cent - 57 employees in Bangladesh.[3/]

Within individual countries, the subsidiary firms of Swiss investors are ooncentrated in the economically most developed centres and regions.[4/] For example, in 1971, over 90% of wage-earners employed by Swiss firms in Brazil were working in the Sao Paulo, Rio de Janeiro, Brasilia triangle.

1/ G. Berweger. Investition und Legitimation. Privatinvestitionen in Entwicklungsländern als Teil der schweizerischen Legitimationsproblematik. Diss. St. Gallen 1977.

2/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Papers on Structural Changes No. 7, May 1979.

3/ Ibid.

4/ G. Berweger. Investition und Legitimation. Privatinvestitionen in Entwioklungsländern als Teil der schweizerischen Legitimationsproblematik. Diss. St. Gallen 1977.

A recently published monograph on Swiss industrial investment in Mexico[1/] confirms this aspect of regional concentration: 58% of employees and 67% of wage-costs of Swiss industrial firms fall to Mexico City and its metropolitan region. A total of 68% of employees and 76% of wage costs fall to the regions in the highest minimum wage bracket. Regions with the lowest minimal wage group account for only 11% of employees and 7% of wage-costs. Nevertheless, 12 of the 28 production plants are in the least industrialized planning zone III. This is partly due to availability of raw materials, partly because of ecological considerations.

We have very approximately divided the 1976 employment figures for Swiss industry in the developing countries outside Europe according to branches.[2/]

	Numbers Employed in 1976 (approx.)
1. Food, beverages, tobacco	31,000
2. Metals and machinery 2a. Metals about 3,000 2b. Machinery about 23,000	26,000
3. Chemicals	25,000
4. Textiles/Wearing apparel 4a. Shoes about 3,000 4b. Textiles and other wearing apparel about 1,000	4,000
5. Non-metallic mineral products except petroleum and coal	6,000
6. Watches, jewelry	1,000
7. Miscellaneous (wood/furniture, paper, printing, plastics)	2,000
TOTAL	95,000

1/ Ch. Iffland and A. Galland. Les Investissements Industriels Suisses au Mexique. Lausanne, 1978.

2/ For methodological details, please refer to the working paper of K. Ulmi.

The branch classification is based on the dominant activity of the parent firm in Switzerland. (The figure given for the chemical industry includes some personnel really working in the food line - scarcely amounting to more than 1,000 people. The 3,000 employees listed under "metals" include some employed in mining, but this figure cannot be determined more precisely. The 3,000 given under "shoes" refers to workers in tanning and chemicals.)

The ratio of employees in the developing countries to the numbers employed at home in the corresponding branches are: food, beverages and tobacco - 59%, chemicals - 40%, non-metallic mineral products excluding petroleum and coal (i.e. cement, ceramics) - 32%, machinery - 10%, textiles and wearing apparel - 5%, metals - 3% and watches - 2%. For the remaining industries (wood/furniture, paper, printing, plastics) taken as a whole, the proportion amounts to perhaps 2%. If we compare the extent to redeployment (both in absolute terms and, more importantly, in relative terms) to the results of the analysis of competitive capacity carried out in Part IV, we arrive at the conclusion that the strongly competitive branches tend to redeploy rather more production to the developing countries, but that the relationship is not a strong one. On the basis of the examination carried out in Part IV, this was not really to be expected. But is precisely the branch-level aggregation which makes the analysis problematic. There are firms successfully redeploying production to other countries which are especially strong in terms of competitive capacity, but which are operating in competitively weak branches. Indeed, there are big firms which operate a priori on a multinational basis and have a relatively small base at home.

Capital redeployment to the developing countries outside Europe is very strongly concentrated among the big firms. From an estimated number of 95,000 employees in developing countries, about 63,000 or 2/3 fall to Switzerland's six largest (measured in terms of company turnover) industrial firms. The biggest industrial frim, Nestlé, alone employs 30,000 people or almost a third of the developing country total. This concentration on the "biggest six" also hold true for the total number of employees in Swiss firms outside Switzerland: 342,496 of a total of at least 500,000 are employed by these six largest industrial firms. At the same time their share of the home industrial employment is only 11% or 74,312 people.

Of the 21,064 employees in the developing countries outside Europe, which was the figure given for a total of 20 firms, 19,865 or 94.3% fell to 11 firms, all with a minimum of 1,000 employees at home. A further 1,064, or 5.1% were employed by 7 firms with more than 100 but less than 1,000 employees at home; and only 135 or 0.6% were employed by 2 firms with less than 100 employees at home.[1/]

In general smaller firms have been more likely - if at all to set up branch operations in neighbouring countries or at least in industrialized countries inside Europe.

It is clear from available information that the structural characteristics of small and medium size firms engaged in capital redeployment scarcely permit reduction to a simple, common denominator. For example, the proportions of production carried out in all other countries, and of production in the developing countries to that carried out in Switzerland range from merely supplementary to dominant.

There are no figures for the total number of Swiss industrial firms with experience in capital redeployment to the developing countries. But the UNIDO redeployment survey provides us with the following data: of the 192 firms which responded to the survey questionnaire, 34 had experience in the developing countries outside Europe, 26 of these - 13% of the responding firms - were unambiguously engaged in capital redeployment. However, the basic sample of 500 firms covered by the redeployment survey[2/] showed a significant above-average company size: there were about 380 home employees per firm included in the sample, as opposed to 85 in the industrial cross-section.[3/] The firms which responded showed an average of about 900 employees in Switzerland. We can also assume that firms which responded are more interested in the redeployment issue than the non-respondents, whatever firm size. Of the total of 8,090 Swiss industrial frims, no more than 1.5-2% have experience in capital redeployment to the developing countries outside Europe, in other words between 120 and 150 firms.

1/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Papers on Structural Changes No. 7, May 1979.

2/ Ibid.

3/ ESTA, unpublished tabulations for 1976.

The only systematic evaluation of reasons given by firms for past capital redeployment is that by Maillat.[1/] The following reasons were mentioned by those firms which have set up branches in countries of the third world or in the mother countries of Swiss immigrant labourers:

Main Reason	Percentage
Sales:	47%
of which "new markets"	29%
of which "tariff limitations"	18%
Labour market (in the widest sense)	53%
of which "availability"	25%
of which "lower wage-level"	14%
of which "production costs in Switzerland too high"	14%

"Production costs in Switzerland too high" is subsumed under "labour market" because in the majority of cases the wage bill was the most important factor. But exceptions are important. In the case of the food industry, "production costs in Switzerland too high" was given as the main reason for redeployment more often than for any other industry (33%). In view of the above-average capital intensity of this industry (see Part III), there may well be grounds apart from wage-costs (transport costs for raw materials, for example) that play a role.

The sales motive is especially pronounced in the chemical industry (83%), labour market orientation for textiles and wearing apparel (83%) and the watch industry (82%). Maillat views the result for the watch industry as surprising, since he hypothesized that sales orientation would be at least equally important. The slight orientation of the chemical industry to the labour market is explained by the capital intensity of this industry, by its competitive ability on the Swiss labour market, and by its heavy use workers who commute daily from France and Germany.

To a far greater extent than the non-multinational firms (70% labour market oriented), multinational firms mention sales orientation(72%).

1/ P. Maillat. Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales. Le cas de la Suisse. ILO Geneva, 1977 (espeoially volume III which contains the results of a questionnaire).

The analysis of capital redeployment by branches does not give us any information about which products and production-processes are involved in these redeployment activities. There are no sources at our disposal other than business reports and publications of the firms. The Appendix to Part V contains the evaluation of two special publications from Nestlé and Ciba-Geigy, as well as of the 1976 business reports of the ten largest Swiss industrial frims plus Schindler, Bally, Hermes-Precisa, and Sibra. Taken together, these firms have about 4/5 of the 95,000 employees of Swiss industry in developing countries outside Europe. From this evaluation, the following conclusions can be drawn:

About 45,000 people are employed in developing countries because of natural location factors (raw materials/transport costs) of the product: food, beverages, tobacco - 31,000; metals - 3,000; shoes (tanning) - 3,000; non-metallic mineral products - 6,000 and some in chemicals and machinery. On the other hand about 50,000 jobs have been redeployed because of sales-orientation, the labour market situation, and the high rate of exchange of the Swiss franc.

In firm documents available only isolated bits of information are given about the export of products produced in developing country locations. In the case of Nestlé, the export portion of the value of production for the developing countries as a whole amounted to only 5% in 1974 (and 18% of the "external expenses" = imports plus dividends, interest, licenses). As a rule what is involved are exports to surrounding developing countries. The most important exception is instant coffee from the Ivory Coast. The isolated indications for other firms also suggest export to the surrounding developing countries and little re-export to the mother country or to countries which were originally sales markets for home production.

Although the available information is rather inadequate, apart from the case of Nestlé and, therefore, of the food industry one could venture the following estimate of the number of jobs redeployed on the basis of exports to the developed countries:

	Approx.
Food, beverages, tobacco	1,000
Metals	1,000
Machinery	1,000
Chemicals	1,000
Textiles/wearing apparel	4,000
Watches/jewelry	1,000
	9,000

Overall, this corresponds to about 1/10 of Swiss industry's employees in developing countries outside Europe.

About 67,000 or a good two-thirds of employees in developing countries outside Europe work in branches which are classified in Switzerland as capital intensive:

	Approx.
Food, beverages, tobacco	31,000
Metals (partly mining), assumption 2/3 of total	2,000
Chemicals	25,000
Tanning ("parent" industry: shoes)	3,000
Non-metallic mineral products etc. petroleum and coal	6,000

Branches which are labour-intensive and at the same time require relatively low labour force qualifications - textiles/wearing apparel and the watch industry - employ a total of about 2,000.

About 24,000, or a quarter, work in branches which in Switzerland are labour-intensive, but at the same time require a relatively high proportion of qualified labour, namely:

Machinery	23,000
Metals assumption: 1/3 of total	1,000

The low number of employees in "labour intensive/low skill" industries in the developing countries and likewise the (relatively) high proportion of "labour intensive/high skill" industries, are significant indicators of inter-branch structural differences and of differences in the resulting potential for internationalized organization of production. (We remind the reader, however, that the above estimates are made without information on the capital or labour intensity of production processes in the developing countries themselves.

The documents available do not allow any comprehensive statements to be made about the adaptation of production techniques to circumstances in the developing countries. Nevertheless, the Maillat study[1/] contains several interesting hints. 91% of the firms which have invested in third world countries or in the mother countries of immigrant workers have adapted their production techniques to the conditions of the labour market (i.e., surplus of labour, lower wages); 67% have given up automation of particular phases of production; 29% have modified the production techniques extensively. Only 6% of the firms have reacted to the lack of qualified labour by applying a production technique which requires less qualified labour; 34% have trained their labour force in the new location and 60% have trained part of them in Switzerland (but a good half of these are Swiss citizens).

The redeployment survey done by UNIDO[2/] asked firms with redeployment experience about "major obstacles/constraints encountered in redeployment projects". Several sorts of obstacles were mentioned: 53% of the responding firms quoted "customs/import restriction", 44% "political instability". "Restrictions to profit transfers" and "administration/ bureaucracy", each of which was mentioned by more than a third (47%) of the respondents, are in part reptitions of the response "state intervention". These findings indicate that, in addition to the low qualifications of the labour force, political factors are of greatest concern.

Small and medium-sized firms (up to 1,000 employees in Switzerland) were more severely affected by "low labour qualifications" than the big firms (59% as opposed to 42%), and also by the "suitability of local partners" (41% as opposed to 16%). On the other hand it appears that for the small and medium sized firms "political" factors create fewer difficulties than for large firms.

1/ P. Maillat. Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales. Le cas de la Suisse. ILO Geneva, 1977 (especially volume III which contains the results of a questionnaire).

2/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Papers on Structural Changes No. 7, May 1979.

The Maillat study[1] confirms that the lack of qualified labour power is an important factor: 35% of the firms with production centers in countries of the third world or in the mother countries of immigrant labourers found "qualified labour in quite insufficient supply" and a further 28% only "partly covered their need for qualified labour." Only 37% found "qualified labour in sufficient supply".

Other Forms of Redeployment

In addition to, or as an alternative to, the relocation of production through capital redeployment, other forms of technological transfers occur:

-licensing and patent agreements
-know-how and technical information agreements
-consulting, management and training agreements
-sub-contracting
-turn-key sales (complete plant) and equipment sales.

Only very sparse information is available on the extent of these other forms of technological transfers to the developing countries. Moreover, we have no answer to the questions: Do such technological transfers represent relocation of productive resources or are they creations of additional capacity?

Licensing and Patent Agreements

It is not possible to do a statistical break-down either according to individual types of services or according to country. Nevertheless, Berweger[2] mentions that the total Swiss lioence and patent receipts for 1957 may have amounted to around 300 million francs, for 1967 to around 600 million francs and for 1973 to over 1 billion. Finally, he cites Gerster's estimate, according to which the contribution of the developing countries to these receipts was at least 200 million francs, or about 20% of the total.

1/ P. Maillat. Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales. Le cas de la Suisse. ILO Geneva, 1977 (especially volume III which oontains the results of a questionnaire).

2/ G. Berweger. Investition und Legitimation. Privatinvestitionen in Entwicklungländern als Teil der schweizerischen Legitimationsproblematik. Diss. St. Gallen 1977.

The redeployment survey by UNIDO[1/] shows that out of 34 firms which gave information about their production experience in the developing countries outside Europe, three mentioned licence fabrication exclusively. Of these three, one was a big machinery firm and two were small/medium-sized firms producing armatures and household equipment.

Over the last few years, this form of technological transfer may have increased more rapidly than capital redeployment. But its significance in terms of employment in the developing countries (and for the Swiss revenue balance) has not, by any means, caught up with that of capital redeployment.

Know-How Agreements, Consulting, etc.

It seems that a strong increase (analogous to what has occurred with licences and patents) is taking place, but a detailed clarification of the extent and the specifics of these developments would only be possible if one had access to intra-firm case-studies.

International Sub-Contracting

Presumably, the predominant portion of international sub-contracting by Swiss industry is recorded in Switzerland's foreign trade statistics as "special trade" and is, thereby, included in the imports from the low-wage countries already analysed elsewhere. Unfortunately, the category of "sub-contracting" is not given separately. For this reason one cannot distinguish precisely whether or not sub-contracting in the real sense is occurring or if it is a question of ordinary importing of parts and intermediate products. From the standpoint of employment in Switzerland, this differentiation is not very important, however.

The so-called improvement processing (production sharing) goods, goods which are sent from one country to another and back again, is categorized separately in Switzerland's foreign trade statistics. In the context of redeployment the outward imporvement processing carried out in execution of a contract i.e., goods produced in Switzerland,

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1/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Papers on Structural Changes No. 7, May 1979.

which undergo additional improvement in other countries is of special interest. Swiss net expenditures for this in 1977 amounted to only 57.5 million francs (with an import value of 148.8 million francs and an export value of 91.3 million francs).[1] The import value thereby reached a mere 0.3% of the total imports to Switzerland. The low-wage countries play an important role in wearing apparel and shoes, accounting for a total of 32.2 million francs of the import value, the Eastern European countries (Yugoslavia, Poland, Hungary) as well as Spain being the most significant. The share maintained by the developing countries outside Europe is under 1%.

Since 1974, the improvement processing under contract has declined. However, there is no simple conclusion to be drawn for the overall significance of subcontracting from this de elopment, since other types of subcontracting may play a greater role. The Maillat study[2] shows that the first priority reaction (for 14% of Swiss firms) to a shortage of labour inside Switzerland is subcontracting to other countries (metals 29%, textiles and wearing apparel 22%, machinery 18%, watches 8%, food and chemicals none).

Turn-Key and Equipment-Sales

Turn-key sales do not form a separate category of the revenue balance but must be estimated from other categories, namely, equipment-sales (which are dealt with in the foreign trade statistics), engineering consultation and the like. As far as we know, no such estimates exist. But there is no doubt that "equipment sales" are very significant. Equipment sales have been a widespread form of technological transfers for a long time. They are an important concomitant of both active and passive redeployment. As far as employment in Switzerland is concerned, the investment goods sector inside Switzerland is the beneficiary.

In order to determine the net effects on employment at home, it would be necessary to analyse the equipment trade with developing countries. This, however, goes beyond the framework of the present investigation.

1/ Federal Customs Directorate, Foreign trade statistics.

2/ P. Maillat. Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales. Le cas de la Suisse. ILO Geneva 1977 (especially volume III which contains the results of a questionnaire).

The Export of Intermediate Products as a Variation on Redeployment

The export of parts and other intermediate products for processing in other countries presents a variation of redeployment which may occur in conjunction with capital redeployment, licensing, subcontracting, etc., or as an independent phenomenon. The watch industry is the most important example.

In 1977, watch movements and parts together accounted for 24% of the total export of Switzerland's watch industry (808 million of 3,379 million Swiss francs). Since 1968 (when it was 21%), the percentage lies only slightly above the 1963 level of 23%. However, while the proportion of watch movements declined since 1968 from 14% to 11%, the proportion of parts rose from 6.5% to 13%. The developing countries (outside Europe) purchase of Swiss watch movements amounted to more than half of the Swiss export of watch movements in 1977, 53% (of 381 million Swiss francs). In 1968, it was only 25% (of 334 million Swiss francs). About 2/3 of the developing countries' share goes to Hong Kong. As one would expect, the share of exports of parts to the developing countries outside Europe is, in comparison, much lower, but even so, strongly on the rise. According to the tariff category 9111.60, "Individual parts, others", for example, the developing countries' share amounted in 1977 to 26% (of 161 million Swiss francs) and in 1968 to 14% (of 74 million Swiss francs).[1/]

Plans and Perspectives of the Firms

This section is based on the redeployment survey done by UNIDO in 1976.[2/] For purposes of comparison we have also drawn on the Maillat study.[3/] Our analysis rests on the number of responding firms; the firms are classified according to size of enterprise. On the basis of the survey data, it is not possible to make anything more than preliminary assertions

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1/ Federal Customs Directorate, Foreign trade statistics.

2/ Industrial Redeployment Tendencies and Opportunities in Switzerland, UNIDO Working Papers on Structural Changes No. 7, May 1979.

3/ P. Maillat. Transfert d'emplois vers les pays qui disposent d'un surplus de main d'oeuvre comme alternative aux migrations internationales. Le cas de la Suisse. ILO Geneva 1977 (espeoially volume III which contains the results of a questionnaire).

about the future development of Switzerland's direct investments or of the quantity of personnel employed in developing countries. Only a complete collection of data on the relevant firms or possibly a series of detailed case studies of representative firms would take us further.

35% of the responding firms answered "yes" to the question: "Do you contemplate in the middle- or long-term transferring part of your production to the developing countries (= outside Europe)?" 26% of small and medium-sized firms (with less than 1,000 employees in Switzerland) gave the answer "yes"; among the big firms this figure was 55%. 18% of the firms are already producing in the developing countries outside Europe (including purely licensed production). This is the case for 9% of the small and medium-sized firms, and for 39% of the big firms.

Taking the positive response to the question simply as a measure of interest in redeployment, one may infer a "level of interest" in industry as a whole. Taking into account the above average size of firms in our sample, it was assumed that the proportion of interested firms in industry as a whole is about 20%. To what extent the result of this interest will in fact be active redeployment or to what extent this interest only registers a late stage in passive redeployment is another matter altogether, and could only be dealt with by long-term studies.

The following differences in the level of interest exist among the individual branches: the greatest interest (46% of the responding firms) is shown by the "precision instruments industry" (including among others the watch industry); the least interest is shown by the food, beverages and tobacco industry (with 21%). The remaining branches correspond approximately to the industrial average of 35%.

If we compare the level of interest with the level of experience, and use it to form an "interest ot experience ratio", we find the following significant deviations from the overall average relation of 2.0. The textile and wearing apparel industries show a ratio of 6.0 and the food, beverages and tobacco industry shows ratio of 1.0, the chemical industry a ratio of 0.9. This can be interpreted as follows: in textiles and wearing

apparel the issue of redeployment has become acute relatively suddenly. In the food, beverages and tobacco industry, the situation has changed less drastically (however, redeployment here rests primarily on what Nestlé does); the chemical industry has already had a great deal of experience with production in the developing countries. (As mentioned above, the watches industry was included under precision instruments and not examined separately.)

In order to find out about the types of redeployment which were of most interest, the redeployment survey made further inquiries of firms which were interested in redeployment to the developing countries. The findings for each firm were written down in so-called "Opportunity Identification Sheets" (late autumn, 1976). Since the information about individual firms is confidential, the information has been structured according to branches in Table V.5. A further differentation is made in the table: whether redeployment is being contemplated within the next two years or not until later. (In interpreting this table, it should be taken into account that more than one type of redeployment could be given in response to the questions.)

First, let us examine the strategies of redeployment in the narrower sense - capital redeployment, subcontracting, licensing. For industry taken as a whole, the predominance of licensing (mentioned by 43% of the firms) over capital redeployment (28%) is unambiguous. Subcontracting comes into play only in the watch industry and in textiles and wearing apparel. Capital redeployment takes priority in the chemical industry. A total of 43 firms (57%) mentioned one or more of these three specific types of redeployment; 21 firms, or barely the half of these, are contemplating capital redeployment, 16 of which mention capital redeployment in conjunction with licensing and/or subcontracting. (This could be either a complementary or an alternative strategy, or both.)

Transfers of technology without explicit connexion to licensed production are more or less mentioned with equal frequency by the individual branches, whereas management training is concentrated on metals and machinery.

Table V.5 Forms of redeployment envisaged

Branch	No. Firms	Capital		Subcontracting		Licensing		Technology/ R + D		Management/ Training		General/ Interest	
		≤ 2y.	> 2y.	≤ 2y.	> 2y.	≤ 2y.	> 2y.	≤ 2y.	> 2y.	≤ 2y.	> 2y.	≤ 2y.	> 2y.
Machines, Metalls	46	7	4	-	-	17	4	22	5	12	4	3	12
Watches	7	3	-	2	-	-	1	3	1	-	-	-	2
Chemicals	8	4	-	-	-	3	1	3	1	-	1	-	-
Textile/ Clothing	8	-	-	3	-	4	-	3	-	1	-	-	4
Sundry	7	3	-	-	-	3	-	3	-	-	-	1	1
Total	76	17	4	5	-	27	6	34	7	13	5	4	19
< 100 employees	7	-	1	1	-	2	2	1	2	-	2	-	3

Source: Redeployment survey by UNIDO, 1976, opportunity identification sheets; Abbreviations: ≤ 2y : within two years;
> 2y : not before two years.

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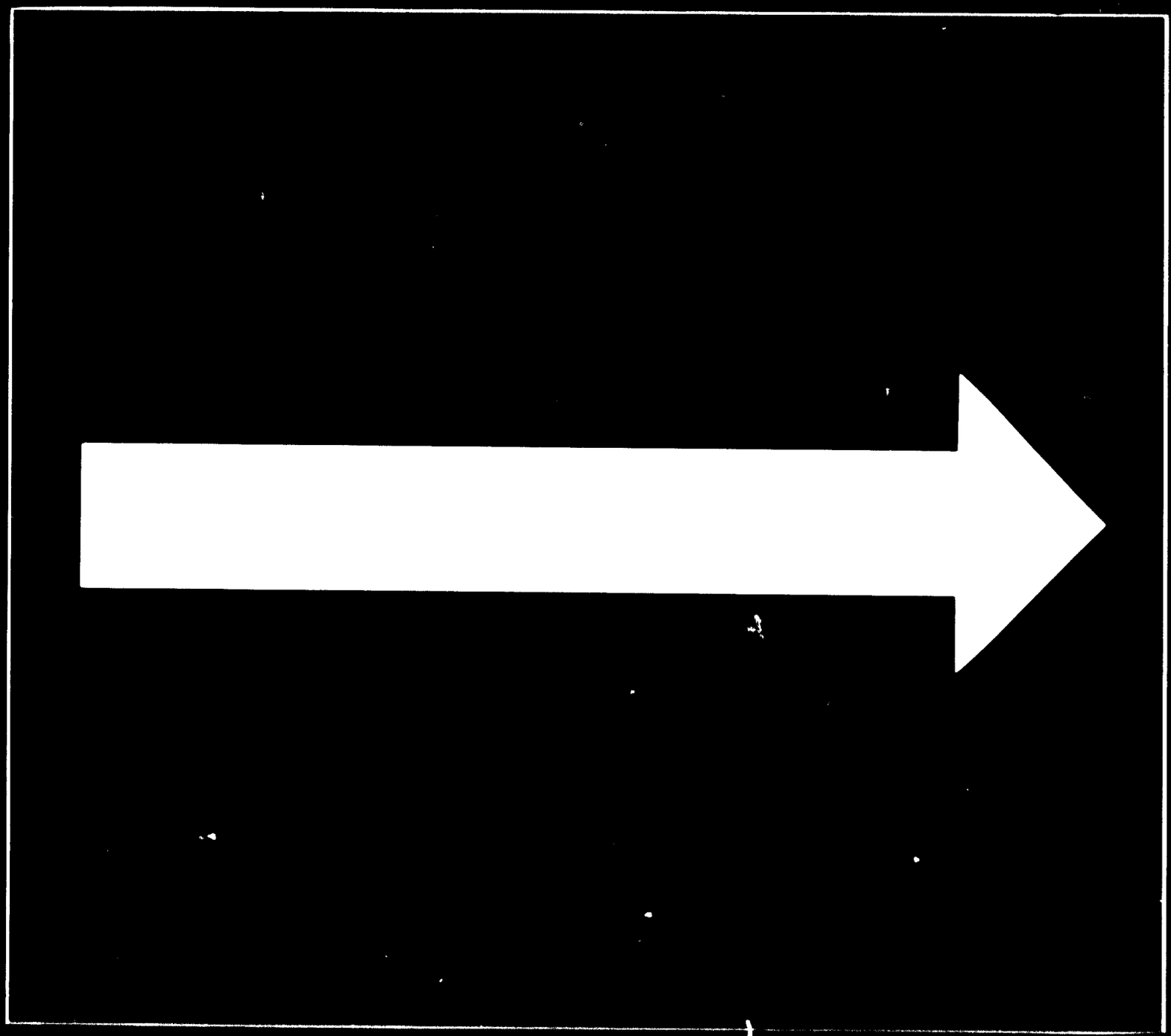

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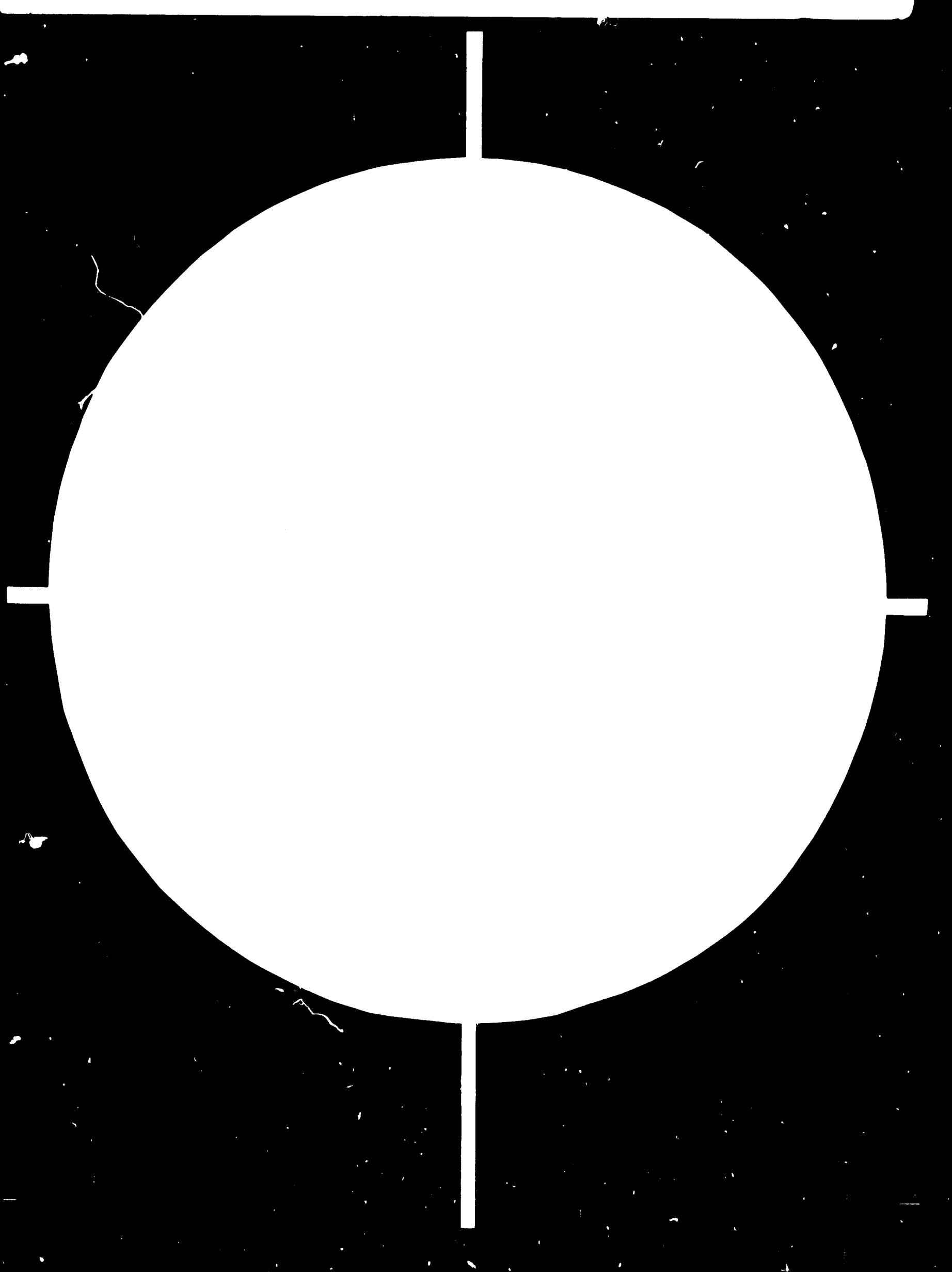

For small firms (with less than 100 employees) licensing is in the forefront - 4 out of 7 firms are considering this type of redeployment, but only one is planning this in combination with capital redeployment. Of 44 firms with between 100 and 1,000 employees, however, 9 were considering capital redeployment, and of the 25 firms with 1,000 or more employees, a total of 11.

Of the firms contemplating capital redeployment in the future - 21 in all - 11 already have had experience. Hence, ten of the 21 firms (7 in machinery and 1 in the watch industry) are "novices". (A total of 60 firms without experience in capital redeployment were questioned.) Even if only a part of these prospective novices reach the stage of putting their plans into effect, this means that there will be further growth of capital redeployment to the developing countries. Whereas in the past 26% of firms reacted to labour shortage primarily through production in other countries, production in other countries is designated as the top priority for future policy by 31%. However, the share of third world countries in total production overseas may not increase notably, at least in the near future.

In the answers, questions about the 3-10 countries favoured for future redeployment to the developing countries, the traditional favorite - Brazil - was reconfirmed; 58% of the firms interested in redeployment mentioned this country. On the other hand, Asiatic and African countries, in particular the OPEC countries, were mentioned more frequently than was to be expected, given the present distribution of redeployed plants. The Southeast Asian "low-cost/high efficiency" countries of Singapore, Malaysia, Taiwan and South Korea received relatively scarce mention, least developed countries practically none.[1/] Market considerations and political stability seemed to play the most important role in the choice of countries.

The redeployment survey asked firms to give their reasons for responding positively or negatively to questions about redeployment plans. Differences according to size of firms and according to branches emerged.

1/ See Ulmi, Working Paper.

"Easier access to market(s)" was mentioned by 69% of firms interested in future redeployment - by 83% of the small and medium sized firms but only by 52% of the large firms; by 83% of the chemical firms; but by only 50% from the textile and wearing apparel industry. 42% gave "lower labour costs in developing countries" as a reason, while this figure for textiles and wearing apparel was 83%. Only 13% mentioned "shortage of labour in Switzerland", but 50% of the textile and wearing apparel firms did so. The reasons for future redeployment of chemicals and textiles and wearing apparel are analogous to their past ones. Not a single firm gave low-cost exports to the Swiss market as a reason for redeploying.

Reasons given for a lack of interest in redeployment are also worth noting. "Inferior quality of labour and production", was most common. "High political and economic risk" and "excess production capacity in Switzerland" were second most common and mentioned with equal frequency.

Neue Züricher Zeitung reports (1978) of press conferences and and annual meetings of the larger firms have also been used as sources for non-confidential information about plans and intentions of individual firms. Extracts from these reports are given in the Appendix to Part V. Incomplete though they are, such newspaper reports do at least indicate a strong awareness of redeployment on the part of firms.

Switzerland's stock of direct investments in the developing countries - both outside and inside Europe - and the employment of labour by Swiss firms in these countries will almost certainly continue to increase in the foreseeable future. But a dramatic increase in capital redeployment should not be expected. Capital redeployment will most likely continue to be dominated by the large firms, in particular by the multinational companies. One crucial reason for this hypothesis is that the branches which primarily come into question for active redeployment to the developing countries on grounds of their factor intensity have either already been "redeployed" to a considerable extent, or their production in Switzerland is predominantly carried on by structurally weaker firms, firms that are more likely to experience the effects of passive redeployment.

A strong increase in licensed production and similar forms of redeployment seems, however, predictable.

The preliminary nature of the above conclusions and the fact that they are not yet substantiated by in-depth analysis of future macro- or micro-economic trends in Swiss industry must be remembered.

VI. CONCLUSIONS: POLICY IMPLICATIONS OF ACTIVE AND PASSIVE REDEPLOYMENT

The research results presented in this study show that Swiss firms' stock of direct investments in the developing countries - both outside and inside Europe - and the employment of labour by Swiss firms in these countries is a significant and growing part of the Swiss industrial structure.

But, redeployment of industrial capacities to the developing countries is only one aspect and/or determinant of the structural changes taking place within Swiss industry. Shifts in international and national demand, changes in the relative price of energy and resources, the rising value of the Swiss franc, rising productivity, changes in trade flows with and relocation of industrial capacity to other developed countries and finally redeployment all influence the role of Swiss industry in the international division of labour. Nonetheless, in the next pages the policy implications of passive and active redeployment will be evaluated.

Part IV closed with a classification of interbranch competitiveness. Four distinct groups were identified, namely:

First Group: chemicals, rubber, plastics, machines and equipment.
This group had the following characteristics: strong expansionary drive, successful entry into or defense of export markets and absence of threatening cost pressures.

Second Group: metals, printing and publishing, wood cork, food, beverages, tobacco
These branches display an average expansionary drive or high quality production, a satisfactory export performance, and a cost situation that is bearable.

Third Group: non-metallic mineral products except petroleum and coal watch industry, paper and paper products
This group lags behind in quantitative expansion, has lost ground in export and/or domestic markets where foreign producers have made strong inroads, and feels a severe profit squeeze as a result of unfavourable cost developments and/or lack of innovation.

Fourth Group: textiles and wearing apparel
Here we see an especially unfavourable combination of the characteristics ennumerated for the third group.

It appears that First Group industries are definitely redeploying actively, mainly for reasons of market penetration. Their financial strength and their solid profit situation allow them to acquire the necessary foreign assets and/or to make the necessary direct investments. To exactly what extent lower production costs abroad are a determining factor could only be ascertained on the basis of further case studies. Since the strongest firms of the First Group are already, to a considerable degree, oriented multinationally, their expansion abroad does not, in general, induce sizable direct employment effects inside Switzerland. Moreover, the high technological and innovative qualities of their products and their high qualification requirements for labour have so far sustained profitable production inside Switzerland.

Firms in the Second Group and the better situated firms of the Third Group (and exceptions to the rule in the Fourth Group) will mainly redeploy production because of cost considerations. These firms produce goods farther up the product cycle curve and/or with standardized production processes, for which a site in Switzerland is hard pressed to compensate for cost disadvantages. Moreover, Swiss plants do seem to be of suboptimal size, i.e. unable to take full advantage of economies of scale, and often lag behind in productivity gains. Redeployment with direct employment consequences for Switzerland is much more likely than for branches in the First Group. Again, however, it is difficult to present hard evidence, since developments during the past 3-4 years are not conclusive. To establish past and future trends would require not only special indepth analyses of company behaviour and strategies, but also the study of possible reactions by interest groups and political institutions.

The firms of the Third Group and especially firms in the Fourth Group are faced with passive redeployment. That is, these firms lack the financial and operational strength to redeploy in the active sense.

This fate is likely to strike those lines of production where past and present indicators of output and employment, as well as the cost-price-trade indicators (see Part IV), show especially weak performance. These production lines also overlap with those product groups where the export offensive of low wage countries has been most successful.

In the highly competitive environment of the world market economy, a combination of calculated shrinking - most probably of hardware production - and intensified specialization and innovation - relying more and more on R+D, and know-how production - will characterize those firms which survive. The largest Swiss firms are already moving in this direction and are in a relatively good position internationally. The know-how, R+D, managing and marketing divisions of the companies have been expanding, as the production of material goods inside Switzerland has decline and/or been redeployed. But the changes that the smaller firms will be victims of pressures from international competition is great. The net result may be a speed-up of industrial concentration. The healthy financing of Swiss companies and the hope that the last 2-3 years were just a cyclical down-run have kept the number of closings down to a minimum. This tendency to hold out is reinforced by the fact that the Third and Fourth Groups contain many small and medium sized firms, having strong family ties and long traditions. Such enterprises do not give up easily. They seem to be willing to absorb losses and to face a long and bitter uphill fight. But in the long run, the small (and middle) sized and/or domestically bound industrial enterprises will most likely have go bear the brunt of domestic economic adjustment. It seems that the form and size of the individual firm is at least as important as the average branch indicators in determining firm fate and behaviour. Still, redeployment of existing capacities has been the very rare exception. Compared to the global loss of employment (ca. 11%) the number of plants closing down - forced passive redeployment - has so far remained surprisingly small. Should past/current trends continue, one could expect, however, a definite speeding-up of these processes.

Furthermore, the evidence - based on the one hand on spotty statistics but on the other hand on plans of large and usually multinationally operating companies - shows that growth at least of the large and/or multinational firms will increasingly take place abroad, with low-wage and/or large market developing and semi-industrialized countries gaining in importance.

The following features seem to be decisive for the maintenance or improvement of the competitive ability of Swiss industrial firms producing in Switzerland.

(1) Production of export oriented goods in general (cf. Parts II and III).

(2) Orientation to specific segments of the market, i.e. taking individual client wishes into account.

(3) High levels of technological innovation, i.e. control over the early stages of th eproduction cycle.

(4) Goods with a high value/weight ratio, but not necessarily with a high proportion of domestic value added.

(5) Goods demanding a high degree of services, in particular in the area of investment goods.

The intensity and quality of know-how is especially important for maintaining the competitiveness of Swiss industry. On the relatively large proportion of highly skill, experienced, versatile employees and a high proportion of research and development can continue to enable the production of high quality investment and consumer goods. Dexterity, diligence and reliability in the performance of routine work are the domain where the cheaper labour forces of certain developing countries have cornered the market. It is highly doubtful that Switzerland can remain competitive in the performance of routine work. Moreover, in some cases, the small size of the Swiss domestic market prevents capital intensive manufacture and finishing of mass goods, simply because of the inability to realize economies of scale. Despite the tendency to rationalization

in all branches of Swiss industry, but because of the Swiss highly qualified labour force, Switzerland still has the potential to specialize in flexible small and medium series, a type of product which may continue to exist indefinitely in the investment goods sector. Moreover, it is precisely in this field, that the provision of services and especially technical consultation is becoming increasingly important.

It is often implied that a high proportion of value added in the production process, is a further key to maintaining the competitiveness of Swiss industry. However, the opposite strategy might well be followed: increased buying of supplies from other countries in order to exploit the advantage of the exchange rate of the Swiss franc. For reasons of flexibility and costs, small and medium-sized firms in particular are not necessarily able to follow the dictum "the highest possible proportion of value added" (and hence "make, not buy"). This is true not only for production itself, but also in the area of research and development. In the same way that whole branches buy up an essential part of their know-how (i.e. the textile industry) small and medium sized firms may be forced to take steps in this direction in order to remain competitive.

With few exceptions Swiss industry is still distinguished by the prevalence of small and medium-sized firms. In 1975, the 57 firms with a total of at least 1,000 employees inside Switzerland represented scarcely more than 35% of Swiss industrial employees and 27% of employees in industry and manufacturing trades. Nevertheless, it is precisely this category of large firms which shows a disproportionately high investment quota. The remaining 2/3 of industrial employees are distributed among firms with less than 1,000 industrial employees. The possibility for these firms to adapt successfully - particularly via investment intensive offensive strategies (R+D, finishing, and marketing) - are often limited by financial considerations. All too often their personnel, organizational structure, and physical assets are too limited for such changes. Herein lies one of the major structural weaknesses of Swiss industry. The so-called "Impulsprogram", designed to promote co-operation among individual firms, especially in

the area of research and development. It may be a sign of reorientation and change.[1]

However, the revenue situation of firms, especially small and medium sized firms, should continue to be hurt by the revaluation tendency (as has already been the case since 1973), the financing of any new investment, whether at home or abroad, would be doubtful; and private investment inside Switzerland would very likely be too inadequate to provide sufficient jobs for those who have been displaced and for those entering the job market for the first time.

In short, a general loss of Switzerland's competitiveness as a site for industrial production is a simple fact. The exact extent of this loss and the distribution of its effects - ranging from the beneficall; affected and the deadly affected - on diverse lines of production and the various branches cannot be mathematically calculated. But to the extent that structural adjustments are planned for and/or enforced by a national economic policy aimed at maintaining the competitiveness of at least some Swiss firms by contractionary demand management, then disadvantaged employers and employees must be expected to mount a political defense strategy.

Since the recession of 1974/75, Swiss economic growth has fallen short of world-wide growth, whereas during the 1960's Swiss economic expansion was much more rapid than world-wide expansion. This has led to a dramatic increase in the export portion of Switzerland's gross domestic product (cf. Part II). At the present time, the strategy of firms located in Switzerland, as well as of the Swiss authorities, to overcome slowed domestic growth has been concentrated almost exclusively on export promotion. Since 1975, Switzerland has been able to raise its export quota by 8 percentage points. Since medium run prospects for expansion of domestic demand are not bright - because of a demographic standstill and stagnating purchasing power - hopes for growth of industrial production inside Switzerland rest exclusively on a continued rise in exports. Such an export strategy,

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1/ We note that the Swiss Federation of Commerce and Industry is vehemently fighting against even this modest proposal.

however, is confronted by major obstacles and limitation. In the first place, the recent increase in exports was accompanied not by an increase, but by a dramatic decrease in employment.

Since 1973, there has been a dramatic reduction in the number of jobs inside Switzerland. The total domestic labour force has been reduced by 12 per cent. This reduction in the size of the labour force was accomplished not by a rise of unemployment inside Switzerland but primarily by the return of foreign workers to their homelands. Nearly 250,000 foreign workers, 8 per cent of the labour force of 1973, have left the country. Industrial production in mid-1978 was at the level of 1971.

In the second place, all countries participating in the world market economy are fighting to increase their share of exports and to reduce their share of imports, and this at a time when growth rates have already declined or are declining almost everywhere. As well, the high value of the Swiss franc directly impairs the competitiveness of Swiss exports. Goods produced in Switzerland are often simply too expensive for foreign buyers, as well as for Swiss buyers, who have the option to switch to imported goods. Not surprisingly, competition of imports on the Swiss domestic market is becoming more and more fierce. In short, high production costs for industry located in Switzerland, low domestic demand, and pressures on firms to gain access to foreign markets mean that Swiss industrial firms are seeking profits more and more by producing and selling elsewhere. While investment plans and growth prospects for industrial activity inside Switzerland are decreasing, Swiss industries are being redeployed to foreign countries - both to the developed and to the developing countries.

What made it so tempting to Americans to buy up firms in Europe during the period of the over-valued dollar, is repeating itself; but now it is the Swiss who can undertake such direct investments in other countries. Low capital costs at home combine with lower labour costs and an advantageous rate of exchange overseas to make redeployment highly attractive. Consequently, the major part of new capital investments by Swiss firms will most likely take place in other countries, especially in those countries favoured by the rate of exchange, i.e. the United States, on the one hand, and low-cost/high-efficiency sites, on the other.

Redeployment to the developing countries involves the creation and build-up of plant capacities, thus potentially stimulating the export of investment goods. But redeployment to developed countries such as the United States, where, for example, idle plant capacity or indigenously produced hardware can be purchased, may not necessarily increase Swiss export potential.

In the first phase of redeployment, the interests of the First World countries seemed well protected; redeployment induced additional exports and the interests of the firms and their employees in the developed country itself clearly dominated. Now things are different. The developing countries represent a big reservoir of labour supply but not a large effective demand. Unless overall growth of world demand rises fast enough to absorb industrial goods produced by cheap labourers in the Third World (i.e. labourers who themselves cannot purchase these goods), industrialization of the developing countries - if oriented to the world market - must lead to a reduction of industrial employment inside the developed countries.

APPENDIX 1

Appendix to Part III

The work of the St. Gall Centre for Futures Research (SGZZ)

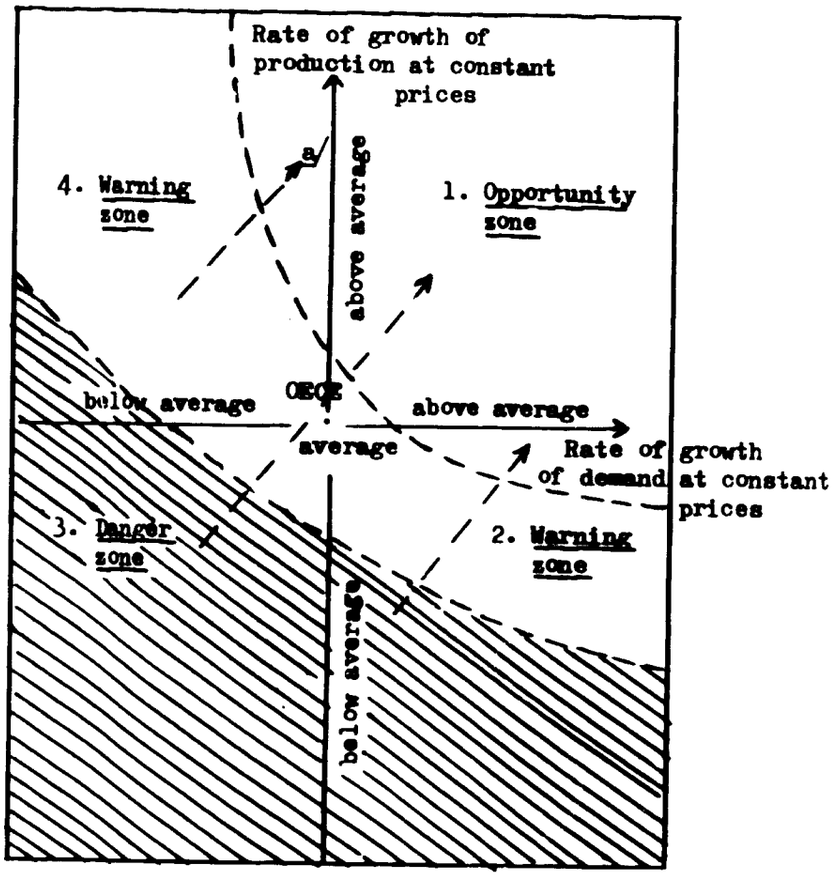
The first more or less comprehensive study[1/] of Swiss industrial branches was written in 1971 under the directorship of F. Kneschaurek. It is based on a model which estimates domestic demand on the basis of past development (income elasticity) and then, via an import function (import elasticity), estimates domestic production. Total production is derived from the latter and from an export function which is derived from an analysis of international demand. Taking account of technically and structurally determined productivity differences, the model produced estimates of the future labour needs of the respective branches. This study (for 1958-1969) represents the first attempt to estimate and establish a means of calculating the supply side of the gross domestic product. However, the study lacks any considerations of price levels. At present the SGZZ is working out a new model which takes diverse price variables (exchange rates, export and import prices) into account and which, in contrast to the study of 1971, tries to assess different development possibilities. The first results are intended to be ready at the end of 1978.

According to Kneschaurek, what is fundamental for assessing developmental possibilities for the respective branches is the development of productivity and size of demand.

An indirect approach to the qualitative aspects of production can be broached by the level of the qualifications of the employees in the relevant branches. In this connexion, more recent investigations by the SGZZ, which make full use of 1970 population figures, provide additional information. They give information not only about the qualifications structure of the employees in the different branches, but also about the level of education attained by the foreign wage-earning population.

1/ F. Kneschaurek, Arbeitsgruppe Perspektivstudien. Entwicklungsperspektiven der schweizerischen Volkswirtschaft bis zum Jahr 2000, Teil 3. Branchenmässige Entwicklungsperspektiven, Band 1, St. Gallen, 1971; and St. Gall Centre for Futures Research, Die Ausbildungsstruktur der schweizerischen Wohn- und Erwerbsbevölkerung, Mitteilungen SGZZ, 15 March 1977, No. 3, and 15 December 1977, No. 4.

Criteria for the development changes of branches and firms in a highly developed industrial country



Kneschaurek distinguishes between four combinations:

First quadrant:	Growth branches;
Second quadrant:	For Switzerland: mainly service industries;
Third quadrant:	Mainly marginal firms of all branches;
Fourth quadrant:	Branches in which below-average demand can lead to over-production and eventually to price wars.

a/ - - -→ Path for ameliorating the own development chances.

Table III.6 The education of wage-earners by branches (1970)

(Percentage)

Branch	Employees Total	University	Technical school	High school	Trade school apprenticeship	On-the-job training	Untrained
1. Agriculture	230,664	0.2	0.1	0.3	20.0	25.9	53.5
2. Mining and quarrying	6,800	0.4	0.7	1.3	29.5	28.1	40.0
3. Food, beverages and tobacco	113,172	0.9	0.4	2.1	44.8	14.0	37.8
4. Textiles	63,803	0.6	1.7	1.9	23.4	21.3	51.1
5. Wearing apparel, shoes, etc.	75,109	0.2	0.3	1.4	37.6	19.5	41.0
6. Wood and cork	63,059	0.1	0.4	1.1	56.1	12.9	29.4
7. Paper and paper goods	20,217	0.6	1.3	1.8	28.2	14.2	53.9
8. Printing and publishing	63,469	1.3	0.3	3.0	53.3	11.0	31.1
9. Leather, rubber and plastics	23,373	0.6	1.2	1.8	37.2	14.4	44.8
10. Chemicals	67,098	8.1	2.9	4.5	41.1	12.1	31.3
11. Non-metallic mineral production except petroleum and coal	29,744	1.0	1.6	1.7	31.9	16.6	47.2
12. Metals	185,571	0.7	2.1	1.4	47.2	13.1	35.5
13. Machinery and equipment	316,386	1.8	4.5	1.7	46.7	12.6	32.7
14. Watches	87,251	0.5	1.2	2.1	32.0	15.7	48.5
15. Electricity, gas, water	23,447	1.7	5.5	2.1	62.2	8.7	19.8
16. Other industries	21,511	0.4	0.6	3.0	49.4	14.3	32.3
17. Construction	285,151	2.2	3.7	0.9	36.3	18.3	38.6
Subtotal Manufacturing and Construction (2-17)	1,445,161	1.6	2.5	1.7	42.1	14.9	37.2

Source: St. Gall Centre for Futures Research (15 March 1977 and 15 December 1977).

Table III.7 The schooling and professional education of the total wage-earning population by country of origin and sex (1970)

Education	Employees Total		Swiss						Foreigners					
			Total		Men		Women		Total		Men		Women	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
1. University	99,391	3.3	77,274	3.3	68,583	4.5	8,691	1.1	22,117	3.4	18,750	4.3	3,367	1.5
2. Technical school	48,000	1.6	37,905	1.6	37,761	2.5	144	0.0	10,095	1.5	9,816	2.3	279	0.1
3. High school	129,37	4.3	113,191	4.8	56,978	3.7	56,213	7.0	16,184	2.5	7,458	1.7	8,726	3.9
31 Access to university	41,881	1.4	38,821	1.7	15,767	1.0	23,054	2.9	3,060	0.5	734	0.2	2,326	1.0
32 Teachers seminar	78,115	2.6	66,376	2.8	38,676	2.5	27,700	3.5	11,739	1.8	6,023	1.4	5,716	2.6
33 Others	9,379	0.3	7,994	0.3	2,535	0.2	5,459	0.7	1,385	0.2	701	0.2	684	0.3
4. Secondary school	1,026,743	34.3	913,068	39.0	592,101	38.5	320,967	40.1	113,675	17.3	74,419	17.1	39,256	17.7
5. Primary school	1,471,084	49.1	1,071,183	45.8	705,044	45.8	366,139	45.7	399,901	60.9	263,091	60.4	136,810	61.7
6. School not known/ none	221,184	7.4	126,126	5.4	77,459	5.0	48,667	6.1	95,058	14.5	61,828	14.2	33,230	15.0
7. Total	2,995,777	100.0	2,338,747	100.0	1,537,926	100.0	800,821	100.0	657,030	100.0	435,362	100.0	221,668	100.0
1-3 Higher education	276,766	9.2	228,370	9.8	163,322	10.6	65,048	8.1	48,396	7.4	36,024	8.3	12,372	5.6
4-7 Full professional education	1,192,592	39.8	1,055,415	45.1	790,359	51.4	265,056	33.1	137,177	20.9	103,317	23.7	33,860	15.3
4-7 Partial professional education	491,962	16.4	345,762	14.8	199,133	13.0	146,629	18.3	146,200	22.2	100,802	23.2	45,398	20.5
4-7 Without professional education	1,034,457	34.5	709,200	30.3	385,112	25.0	324,088	40.5	325,257	49.5	195,219	44.8	130,038	58.7
7. Total	2,995,777	100.0	2,338,747	100.0	1,537,926	100.0	800,821	100.0	657,030	100.0	435,362	100.0	221,668	100.0

Source: St. Gall Centre for Futures Research (13 March 1977 and 15 December 1977).

Studies by the Centre for Economic Research (Swiss Federal Institute for Technology, Zurich)

Most of the studies briefly summarized here take foreign trade as their point of departure. Foreign trade statistics - in contrast to statistics on costs, production and employment - are extremely detailed and therefore permit analysis of specific products, though admittedly only after much painstaking work.

However, first a study will be considered which is not oriented to foreign trade, but which is of conceptual interest.[1/] Starting from the observation that the factors of production know-how and capital represent locational advantages for Switzerland, indicators are developed for these two factors:

- Know-how: highly qualified employees as a percentage of employed;
  wage costs (including social services per employee;
  the difference between the average wage for all workers in the branch and the average wage for unskilled workers in the branch;
- Capital : value added minus wage costs (including social services) per employee.

If these indicators are compared to the industrial average, four combinations result, combinations which served the authors as initial criteria for the branch analysis:

1. Characteristics: Low capital input per employee
   Low qualification requirements of the labour force
   - Parts of the food industry (meat, grain products, cocoa/chocolate/ sugar products);
   - Textile industry;
   - Wearing apparel industry;
   - Shoe industry;
   - Wood products and furniture industry;
   - Production of toys and sporting goods;
   - Production of paper and cardboard goods;
   - Production of leather and leather goods;
   - Household, industrial and building ceramics;

1/ Strukturwandel in der schweizerischen Industrien, Berichte der Konjunkturforschungsstelle "Studien", Sonderbericht No. 137, December 1976.

- Parts of the metal goods industry (wire goods among others, cable, metal insulation, knives and cutlery, tin goods and lamp fittings);
- Production of household machines and appliances (including radio, television);
- Watch industry;
- Jewelry;
- Production of musical instruments;

Number of employed according to the industrial statistics of 1974: 266,000.

2. Characteristics: High capital input per employee
Low qualification requirements of the labour force

- Parts of the foodstuffs industry (tinned foods, milk products, oils and fats, animal feed);
- Beverage industry;
- Tobacco industry;
- Woodwork and production of wooden semi-manufactures;
- Production of cellulose, paper and cardboard;
- Rubber industry and plastics industry;
- Cement, chalk and gypsum industry; brickworks;
- Glass and glass products industry;
- Basic metal industry (except light metals);

Number of employed according to industrial statistics of 1974: 115,000.

3. Characteristics: Low capital input per employee
High qualification requirements of the labour force

- Vehicle and transportation industry;
- Machinery and appliance industry (without further specification);
- Production of textile machinery;
- Production of machine tools;
- Production of precision tools, optical and medical equipment and instruments;
- Printing and publishing;

Number of employed according to industrial statistics of 1974: 270,000.

4. Characteristics: High capital input per employee
High qualification requirements of the labour force

- Chemical industry;
- Parts of the metal goods industry (machinery and stamping press tools, light metals goods, light bulbs, fluorescent tube lights, metal furniture);
- Production of light metals and semi-finished goods;

- Production of office machines;

Number employed according to the industrial statistics of 1974: 90,000.

A study especially concerned with the development of Swiss industry's share of foreign markets is that of U. Birchler and H. Würgler. Because this study confines itself to the investigation of the markets of the fifteen OECD countries and therefore does not explicitly take into consideration the less developed countries, a tabular summary of their most important results will have to suffice.

The study by H. Hollenstein,
Chapter II, deals specifically with the less developed countries. The following tables are reproduced from the study and show its main results.

Hollenstein assesses the competitiveness of the low-wage countries with the help of three criteria:

(i) Increase in the low-wage country import quota for the period 1970-1975 as a measure of the change in their competitive capacity;

(ii) Level of low-wage country import quota as a measure of the low-wage countries' share of the market;

(iii) Trend of the branch-specific Swiss foreign trade account for the period 1960-1962 and 1972-1974. What is of primary importance here is the extent to which the balance of trade in real terms vis-à-vis the low-wage countries is developing in comparison to the balance of trade with the whole world. This criterion permits us to infer how far a branch has advanced with its goods in the product cycle. In the case of product-cycle goods, it is to be expected that the balance of trade vis-à-vis the whole world will at first recede (with the continued rise in the balance of trade vis-à-vis the low-wage countries), but that with growing of the product cycle maturity, the balance of trade vis-à-vis the low-wage countries will also recede.

From a total of 112, the following rank-ordering gives a summary of the most severely endangered lines of production. (This ordering is based on (i) an increase in the low-wage country import quota of more than 3 percentage

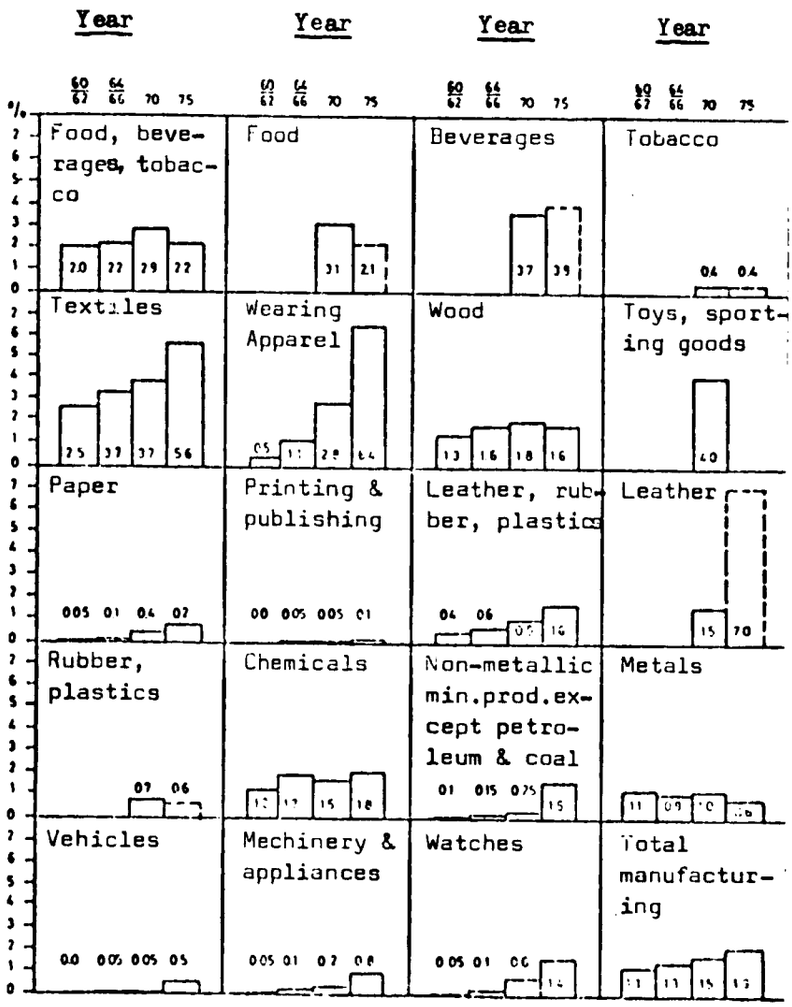
Table III.8 The proportion of Switzerland's exports on the import markets of the fifteen OECD countries, by selected product groups
(Annual average compiled from the quartal data for 1970-1976)

(Percentage)

Product groups	1970	1971	1972	1973	1974	1975	1976
Machines and vehicles	2.22	2.37	2.21	2.39	2.33	2.39	2.25
Generators	2.35	2.54	2.02	2.87	2.30	2.08	1.98
Railway vehicles	5.77	4.08	3.50	4.97	6.05	7.08	6.38
Machine tools	8.77	9.38	9.04	10.03	9.17	8.16	9.19
Textile machines	15.19	19.95	14.87	16.81	16.97	21.35	21.69
Printing, book-binding machines	7.66	7.19	7.60	8.16	8.42	9.33	8.66
Chemical products total	5.55	5.78	5.83	5.57	4.58	5.09	5.04
Basic chemicals and components	4.74	4.90	5.30	4.62	3.71	4.18	4.03
Dyes, etc.	16.29	16.57	15.58	15.39	14.53	12.82	14.31
Pharmaceuticals	14.10	14.84	14.56	14.72	14.23	15.49	14.95
Medicaments	15.26	15.40	15.48	14.97	15.43	16.91	16.83
Cosmetic oils, perfumes, etc.	6.96	6.99	7.05	7.36	5.73	6.43	6.60
Textile yarns	5.90	5.54	5.87	5.01	5.03	5.40	5.03
Cotton fabrics	5.30	5.19	4.42	4.27	4.18	4.73	4.48
Synthetic fabrics	4.47	4.75	4.68	4.27	4.18	4.73	4.48
Embroidery, etc.	17.73	15.05	14.21	15.30	15.63	15.40	14.33
Wearing apparel	1.53	1.40	1.24	1.16	1.06	1.08	0.95
Shoes	1.95	1.80	1.46	1.36	1.14	1.16	1.14
Food for daily consumption	4.68	4.16	3.89	3.80	3.55	3.71	3.63
Chocolate, etc.	5.11	5.35	5.75	5.93	4.84	4.12	4.48
Miscellaneous food	4.23	4.78	4.47	4.37	4.10	4.34	4.98
Optical appliances, precision instruments and watches	11.76	11.46	10.82	11.38	10.76	10.23	8.78
Watches	53.50	51.14	48.15	48.81	46.92	42.30	33.49
Printing	5.56	6.01	5.65	5.95	5.77	5.01	4.66

Source: Birchler and Wirgler (1978).

Table III.9 Low-wage country import quota[a/] by branches of Swiss industry 1960/1962 until 1975 (based on nominal figures)



Source: H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

a/ The low-wage country import quota is defined as the proportion of low-wage country imports in Switzerland's domestic demand (gross value of production minus exports and plus imports).

Table III.10 Branches and products where the low-wage countries' share of imports in 1973/1975 is above the industrial average

(Percentage)

Branch/Product	Low-wage countries' import share			
	1960/1962	1969/1971	1973/1975	1975
Food stuffs	18.3	24.0	21.7	18.3
- Meat	24.1	36.5	34.9	30.0
- Tinned food	11.0	44.0	45.6	44.8
- Miscellaneous food	40.1	26.8	27.3	27.0
- Animal feed	17.7	25.6	17.8	14.5
Beverages	20.3	17.6	18.8	18.9
- Wine	24.8	22.2	23.3	23.2
- Soft drinks	5.5	8.3	13.7	15.4
Tobacco	25.7	11.9	26.0	31.5
- Cigars	2.2	22.5	34.7	35.9
Textiles	10.8	10.6	14.4	13.8
- Natural yarns	4.0	12.5	11.2	8.9
- Natural fibres	9.0	16.1	18.4	14.9
- Special fabrics	34.7	19.9	27.7	27.6
- Embroidery	45.2	46.9	26.1	20.0
- Hat materials, ropes	14.2	14.7	20.4	16.8
Wearing apparel	3.0	8.8	15.7	17.8
- Woven linens	20.5	47.5	53.0	55.7
- Woven apparel	1.9	8.1	19.4	23.1
- Woven and knitted goods	2.3	9.5	13.0	14.2
- Furs	1.4	9.3	20.6	23.3
- Accessories	5.0	9.1	9.4	10.4
- Shoes	2.4	5.3	10.8	11.7
- Household linens	6.9	6.7	13.5	15.7
Wood	12.4	10.4	10.1	9.1
- Wood preparation	10.5	10.2	10.7	9.6
- Wood products	12.0	8.6	8.3	6.2
- Basket and cork goods	55.4	73.7	72.7	65.0
- Furniture	5.0	5.7	6.4	6.3
Toys and sporting goods				
- Toys	1.0	4.8	7.7	8.4
Leather and leather goods	3.1	5.0	10.9	12.3
- Production of leather	3.3	5.7	9.8	10.6
- Leather goods	2.9	4.1	11.6	13.3
Watches	0.9	9.9	17.3	21.5
- Parts	1.2	13.1	21.9	26.9
- Finished watches	0.0	1.7	9.9	18.4
Jewelry, etc.	9.7	16.6	19.0	21.6
- Jewelry	2.9	6.8	11.4	12.2
- Finished precious stones	14.2	22.2	24.8	29.5
Manufacturing total	4.6	5.0	6.3	6.6

Source: H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf die Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

Table III.10a Branches and products where the low-wage countries' share of imports in 1973/1975 is below the industrial average, but has grown strongly

(Percentage)

Branch/Product	Low-wage countries' import share			
	1960/1962	1969/1971	1973/1975	1975
Textiles				
- Synthetic fabrics	0.74	4.42	5.10	4.93
- Woven and knitted fabrics	0.75	0.87	2.42	2.12
Paper and paper goods	0.38	1.09	1.32	1.75
- Production of paper	0.36	1.18	1.40	1.87
Rubber and plastics	0.37	1.73	1.43	1.40
- Rubber finished goods	0.27	4.37	3.08	2.60
- Plastic finished goods	0.09	0.69	1.27	1.33
Chemicals				
- Pharmaceuticals, cosmetics	0.87	2.24	2.99	3.56
- Wax, matches, etc.	1.64	3.40	4.94	6.52
Non-metallic mineral products except petroleum and coal	0.43	1.07	3.71	5.92
- Glass products	0.58	1.08	6.00	11.07
- Ceramics	0.63	1.94	4.35	4.64
Metals				
- Metal goods	0.44	0.84	1.95	2.23
- Knives, etc.	0.12	1.59	3.65	4.97
- Tin and other metal goods	0.87	1.25	3.29	3.89
Vehicles, transport equipment				
- Bicycles and motorcycles	0.01	1.42	2.74	2.26
- Miscellaneous vehicles	0.06	1.16	1.95	2.04
Machines and appliances	0.18	0.64	1.59	2.04
- Miscellaneous electrical machines	0.40	0.62	1.47	1.79
- Office machines	0.03	0.30	2.84	3.68
- Optics	0.12	0.48	2.84	4.22
- Precision tools	0.27	0.49	1.29	1.64
- Entertainment electronics	0.04	2.16	3.82	4.93
Watches				
- Movements	0.00	0.03	2.33	1.84
Manufacturing total	4.56	5.02	6.27	6.59

Source: H. Hollenstein, Die schweizerischen Importe von Industrieerzeugnissen aus Niedriglohnländern und ihre Auswirkungen auf dei Struktur des industriellen Sektors der Schweiz, WIF/ETH Monatsbericht No. 8, 1977.

points, or (ii) an import quota level of over 5 per cent, and (iii) a change in the production cycle according to the third criteria.)

Textiles:	- special fabrics; - hat materials; - rope-making;
Wearing apparel:	- woven linens; - woven apparel; - furs; - shoes; - household linens;
Leather goods:	- leather goods;
Non-metallic mineral products except petroleum and coal:	- glass products; - ceramics;
Jewelry:	- jewelry; - finished precious stones.

If the tendency of the 1970's continues, it is to be expected that the following branches will move into the "high danger" group in the near future:

Textiles:	- natural fibres; - knitted goods; - synthetic fabrics;
Toys, sporting goods:	- toys; - sports equipment;
Non-metallic mineral products except petroleum and coal:	- internationally tradable goods.

Other lines of production with similar tendencies are:

- Office machines;
- Bicycles and motorcycles;
- Entertainment electronics;
- Optics;
- Watch parts.

A study by the Swiss Federation of Commerce and Industry on Research and Development

The 1978 study is the third of its kind and at the same time the most representative of the work which the institution has already carried out. The repetition of their analyses permits the authors not only a statis survey, but also an assessment of the development of expenditures for research and

1/ Swiss Federation of Commerce and Industry, Forschung and Entwicklung in der sohweizerischen Privatwirtschaft, Bericht zur Erhebung des Vororts im Jahre 1976, Zurich and Basel, 1978.

development in industry between 1969 and 1975. Tables III.11 and III.12 give the major findings of the study. One disadvantage which should be mentioned is the relatively crude classification of branches.

The Kleinewefers study

H. Kleinewefers[1/] attempted to assess the change in Switzerland's competitiveness by calculating a rate of exchange corrected for wage costs per unit of output. He calculated the relative change vis-à-vis other countries in the rate of exchange, in the real wage level, in productivity, and in consumer prices either as competitive advantages (+) or as competitive disadvantages (-). For the period 1960-1976, he arrived at an annual deterioration of Switzerland's competitiveness of 2.6 per cent in foreign markets and 2.4 per cent in home markets. The calculations reveal that, alongside the unfavourable exchange rate, Swiss industry is also experiencing a noticeably lower rise in productivity vis-à-vis other countries.

In addition to this long-term trend of falling competitiveness (which is, however, neither theoretically nor statistically well confirmed), Kleinewefers' study reveals a striking acceleration of this trend with the 1973 change-over to a flexible rate of exchange. Nevertheless, this study is limited to the inter-branch comparisons; the question of a constant or falling overall competitive capacity remains open.

1/ H. Kleinewefers, Fünf Jahre flexible Wechselkurse: Erfahrungen und Probleme, Lecture in St. Gallen, 1978.

Table III.11 Development of research and development expenditures of Swiss industry at home (1969-1975)

Branch	Expenditures 1969		Expenditures 1975		Increase 1969-1975 in per cent
	Total in million francs	Distribution (percentage)	Total in million francs	Distribution (percentage)	
Metals, machinery and equipment	472.6	36.4	849.4[a]	39.1	80
Chemicals	716.4[b]	55.2	1,159.9[a]	53.3	62
Watches	46.4	3.6	80.1	3.7	73
Textiles and wearing apparel	30.0	2.3	36.8	1.7	23
Food, paper, rubber, plastics	19.6	1.5	28.6	1.3	46
Construction	13.1	1.0	19.6	0.9	50
Industry total	1,298.1	100.0	2,174.4[a]	100.0	68

a/ Without expenditure of firms not participating in 1969.

b/ Estimated on the assumption that share of expenditure abroad in 1975 (35 per cent) also valid for 1969.

Table III.12 Research and development expenditures of Swiss industry at home and abroad (1975)

	Expenditures in Switzerland and abroad		Expenditure abroad	
	Million francs	Percentage	Million francs	Percentage
Metals, machinery and equipment	1,396.3	40	456.6	33
Chemicals	1,918.3	55	665.5	35
Watches	81.7	2	1.3	2
Consumer goods industries and construction	87.7	3	2.7	3
Total industry	3,484.0	100	1,126.1	32

APPENDIX 2

Tabular Appendix to Part IV[a/]

Table 1* Output (excluding electricity, gas, water)

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
Manufacturing Total	100	110,0	119,2	121,7	125,0	130,8	132,5	113,3	115,5	119,7
Food, beverages, tobacco	100	106,0	112,6	117,6	121,7	126,9	120,9	113,4	118,4	122,6
Textiles	100	104.0	102.0	103,0	111,9	113,9	110,9	93,1	106,3	107,3
Wearing apparel, shoes etc.	100	104,5	104,5	105,3	105,3	101,7	96,5	91,1	110,6	114,1
Wood, cork	100	108,6	115,3	120,0	125,8	136,2	130,5	106,8	105,7	116,2
Paper & paper goods	100	104,0	110,5	103,2	98,4	102,4	112,1	77,4	83,9	91,2
Printing & publishing	100	108,6	117,9	117,9	115,8	115,0	112,2	95,7	95,7	93,6
Leather, rubber, plastics	100	116,2	128,7	129,4	128,2	139,0	133,8	122,1	148,5	166,1
Chemicals	100	122,7	129,5	135,6	144,0	159,8	170,4	143,9	172,7	171,2
Non-metallic mineral products except petroleum and coal	100	108,9	116,9	128,6	133,0	139,3	130,3	87,5	87,5	86,6
Metals	100	109,3	118,7	122,4	123,4	132,7	129,0	100,0	100,9	111,2
Machinery & equipment	100	110,0	126,7	130,0	129,2	134,3	140,1	127,5	113,4	117,6
Watches, jewelry, engraving	100	105,7	107,8	105,0	116,4	123,4	125,6	101,5	99,3	105,7

a/ Tables 1* through 15* serve to elaborate the information given in the Summary Table. (Sources and comprehensive explanation of the methods of calculations are given in Prader's working paper.)

Table 2* Employment[a/]

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
A. Manufacturing Total	100	100,7	100,9	100,9	99,1	98,3	98,0	88,9	84,7	84,6
Food, beverages, tobacco	100	99,5	98,1	98,9	98,5	99,3	97,6	92,0	90,0	90,6
- Food & animal feed	100	100,0	97,8	98,5	98,3	99,1	97,8	92,0	90,8	91,9
- Beverages	100	96,9	100,1	100,9	98,1	98,5	96,8	92,2	87,0	85,2
- Tobacco	100	97,5	100,3	102,3	103,0	103,5	96,7	92,8	83,8	81,9
Textiles	100	99,7	95,0	92,0	87,8	87,0	83,6	72,3	71,2	70,4
Wearing apparel, shoes	100	99,1	95,5	91,5	89,3	85,3	79,8	70,4	69,0	68,0
Wood, cork, etc.	100	100,3	99,9	99,3	99,2	98,7	96,7	83,0	77,4	78,3
Paper & paper goods	100	97,6	97,4	95,4	94,0	93,5	95,6	86,4	83,9	83,3
Printing & publishing	100	101,1	100,2	102,0	100,2	97,9	98,2	91,2	87,4	87,8
Rubber,plastics,leather	100	101,0	102,0	100,5	99,5	96,8	93,1	80,5	79,0	77,7
- Rubber, plastics	100	101,0	104,5	104,1	104,8	105,5	102,6	87,0	86,0	85,1
- Leather	100	100,9	97,5	93,8	89,3	80,8	75,6	68,7	66,1	64,3
Chemicals	100	106,1	111,4	115,7	115,4	115,7	117,1	114,5	111,2	109,7
Non-metallics min.prod. exc.petroleum & coal	100	97,4	96,3	96,4	95,9	97,2	93,3	78,6	81,6	72,2
Machinery & equipment	100	101,8	103,1	103,7	99,7	97,6	99,9	94,0	89,7	85,4
Metals	100	100,9	101,6	103,0	106,3	107,7	106,9	94,7	87,1	86,7
Watches, jewelry, engraving	100	100,9	105,3	100,7	95,0	95,8	99,0	80,5	73,0	75,1
- Watches	100	101,0	105,6	100,7	94,8	95,5	99,2	80,2	71,8	74,0
- Jewelry, engraving	100	99,0	101,3	101,0	98,7	99,9	96,0	85,4	90,6	91,2
B. Manufacturing Total	100	99,7	98,9	97,8	94,8	93,7	94,5	83,9	79,5	79,6
Textiles	100	99,9	95,5	92,7	87,5	84,7	81,2	70,3	69,3	69,1
- Yarn,thread,fibres	100	100,9	97,4	95,4	87,8	85,6	82,6	71,7	71,7	71,0
- Fabrics	100	99,8	95,8	93,0	89,1	86,7	84,3	72,9	69,6	71,0
- Embroidery	100	100,4	96,6	92,0	87,2	84,8	79,7	68,0	67,7	68,4
- Finishing	100	99,7	92,4	90,2	88,1	81,8	75,5	65,5	65,8	64,6
- Others	100	88,4	74,3	64,1	55,2	51,8	45,3	41,3	39,7	36,2

a/ A = Index of total employment in manufacturing;
B = Index of workers employed in manufacturing.

Table 3* Productivity = $\frac{\text{Production x 100}}{\text{Employment}}$

(1968 = 100)

	67	68	69	70	71	72	73	74	75	76	77
Manufacturing Total	95,5	100	109,2	118,1	120,6	126,1	133,1	135,2	127,4	136,4	141,5
Food,beverages,tobacco	95,7	100	106,5	114,8	118,9	123,6	127,8	123,9	123,3	131,6	135,3
Textiles	93,4	100	104,3	107,4	112,0	127,4	130,9	132,7	128,8	149,3	152,4
Wearing apparel, shoes etc.	96,6	100	105,4	109,4	115,1	117,9	119,2	120,9	129,4	160,3	167,8
Wood, cork, etc.	96,1	100	108,3	115,4	120,8	126,8	138,0	135,0	128,7	136,6	148,4
Paper & paper goods	94,8	100	106,6	113,4	108,2	104,7	109,5	117,3	89,6	100,0	109,5
Printing & publishing	91,9	100	107,4	117,7	115,6	115,6	117,5	114,3	104,9	109,5	106,6
Leather, rubber, plastics	105,0	100	115,1	126,1	128,5	129,1	143,6	143,8	151,6	188,1	213,8
Chemicals	95,6	100	115,6	116,2	117,2	124,8	138,1	145,5	125,7	155,3	156,1
Non-metallic mineral products except petroleum and coal	95,9	100	111,8	121,4	133,4	138,7	143,3	139,7	111,3	107,2	119,9
Metals	98,9	100	108,3	116,8	118,8	116,1	123,2	120,7	105,6	115,8	128,3
Machinery & equipment	108,3	100	108,1	122,9	125,4	129,6	137,6	140,2	135,6	126,4	137,7
Watches, jewelry, engraving	98,7	100	104,8	102,3	104,3	122,5	128,8	126,9	126,0	136,1	140,7

Table 4* **Average wages per employee by sectors and branches**

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
Total (All Sectors)	100	106,1	116,2	130,6	145,0	162,3	182,2	195,6	199,9	204,3
Services	100	106,0	115,4	129,2	143,3	160,2	178,6	192,9	198,5	204,3
Manufacturing Total	100	106,4	117,0	131,4	145,9	164,1	185,1	198,7	203,0	207,4
Food,beverages,tobacco	100	105,6	117,2	131,3	147,3	165,8	186,4	201,9	208,0	214,3
- Food and animal feed	100	105,5	117,2	131,2	147,7	167,0	187,4	202,8	208,5	214,4
- Beverages	100	105,3	114,9	128,8	142,7	155,8	176,2	192,8	199,6	206,6
- Tobacco	100	107,8	120,1	136,2	149,5	167,0	189,4	205,7	214,7	224,1
Textiles	100	108,0	121,6	140,5	155,5	176,9	199,6	210,6	218,2	226,1
Wearing apparel, shoes etc	100	106,9	119,5	135,5	150,0	168,3	187,4	195,0	199,5	204,1
- Wearing apparel	100	106,9	119,6	135,5	149,8	168,0	187,4	196,0	199,3	202,7
- Shoes	100	108,9	122,1	139,5	153,2	171,0	189,6	194,0	200,4	207,0
Wood, cork	100	106,1	117,0	131,4	147,9	166,5	186,0	196,7	198,1	199,5
- Wood products	100	106,9	117,9	132,8	148,3	166,3	187,0	199,9	201,7	203,5
- Furniture,fixtures	100	106,1	116,9	131,0	147,6	165,6	184,8	195,0	195,9	196,8
Prams, sporting goods	100	108,0	118,9	132,3	147,0	163,8	185,3	187,5	200,4	214,2
Paper and paper goods	100	104,3	115,7	131,3	146,0	164,5	185,4	198,4	202,2	206,1
- Cellulose,paper,cardboard	100	103,2	112,8	127,7	140,2	160,0	179,2	192,6	195,5	198,4
Printing & Publishing	100	104,0	112,3	126,0	141,3	159,4	179,8	196,7	202,6	208,7
Leather,rubber,plastics	100	106,4	119,4	133,4	148,7	166,3	188,2	197,3	202,0	206,8
- Leather	100	107,5	119,3	132,2	146,5	164,4	186,2	198,3	205,3	212,5
- Rubber, plastics	100	105,9	119,4	133,9	149,6	167,1	189,0	196,9	200,6	204,4
Chemicals	100	108,5	117,3	132,8	147,6	164,8	188,8	202,2	210,7	219,6
Non-metallic min.prod.exc. petroleum and coal	100	105,6	117,9	133,9	150,1	168,4	189,8	203,6	207,7	211,9
- Artificial stones, cement gypsum	100	105,6	119,2	135,8	151,7	169,9	189,9	203,4	206,9	210,5
Metals	100	106,3	116,7	131,5	146,8	166,2	186,1	196,4	197,9	199,4
Machinery & equipment	100	106,6	117,8	131,7	143,5	160,7	181,5	197,5	202,5	207,6
Watches, jewelry, engraving	100	106,7	113,5	124,0	135,6	151,8	175,9	190,5	191,0	191,5

Table 5* Wages and social security payments made by the firm per employee (in thousand Swiss francs), and in per cent of the average wage in manufacturing 1968-1977

	68	69	70	71	72	73	74	75	76	77
Manufacturing Total	15,0 100	16,0	17,6	19,8	22,0	24,8 100	27,8	29,9	30,5 100	31,2
Food, beverages, tobacco	13,1 87,3	13,9	15,4	17,3	19,9	21,8 87,9	24,5	26,5	27,3 89,5	28,2
Textiles	12,8 85,3	13,9	15,6	18,0	20,0	22,3 89,9	25,6	27,0	28,0 91,8	29,0
Wearing apparel, shoes etc.	10,1 67,3	10,8	12,1	13,7	15,2	17,0 68,6	19,0	19,7	20,2 66,2	20,7
Wood, cork	12,8 85,3	13,6	15,0	16,8	19,0	21,3 85,9	23,8	25,2	25,4 83,3	25,6
Paper & paper goods	15,6 104,0	16,3	18,1	20,5	22,8	25,7 103,3	29,0	31,0	31,6 103,6	32,2
Printing & publishing	15,9 106,0	16,5	17,8	20,0	22,4	25,3 102,0	28,5	31,2	32,1 105,3	33,1
Leather, rubber, plastics	13,8 92,0	14,7	16,5	18,4	20,5	23,0 92,7	26,0	27,3	27,9 91,5	28,6
Chemicals	23,4 156,0	25,4	27,5	31,1	34,6	38,6 155,7	44,2	47,4	49,4 162,0	51,5
Non-metallic mineral products except petroleum and coal	16,4 109,3	17,3	19,3	21,9	24,6	27,6 111,3	31,1	33,3	34,0 111,5	34,7
Metals, machinery and equipment	15,8 105,3	16,8	18,5	20,7	22,8	25,6 103,2	28,9	31,1	31,6 103,6	32,2
Metals	15,4 102,7	16,4	18,0	20,3	22,6	25,6 103,2	28,7	30,3	30,5 100,0	30,8
Machinery and equipment	16,0 106,7	17,0	18,8	21,0	22,9	25,6 103,2	29,0	31,5	32,3 105,9	33,1
Watches, jewelry, music instruments	14,0 93,3	14,9	15,9	17,4	19,0	21,3 85,9	24,6	26,7	26,8 87,9	26,8

Table 5a* **Wage level by branches in per cent of the average in manufacturing**

	Workers		Other Employees	
	1968	1976	1968	1976
Manufacturing Total	100	100	100	100
Food, beverages, tobacco	92,3	94,5	86,2	88,3
- Food	91,9	94,4	82,0	84,2
- Beverage	104,9	103,1	104,1	103,1
- Tobacco	77,7	82,2	108,3	114,5
Textiles	77,7	83,5	96,5	103,7
Wearing apparel, shoes, etc.	75,0	73,7	87,1	85,6
Wood, cork	105,9	103,3	99,8	97,4
Paper & paper goods	98,7	98,3	105,9	105,5
Printing & publishing	113,3	113,1	96,4	96,2
Leather (without shoes)	88,9	89,9	91,7	92,7
Rubber, plastics	101,9	100,7	101,5	100,3
Chemicals	112,8	117,1	111,1	115,3
Non-metallic mineral products except petroleum & coal	105,5	107,9	107,1	109,6
Metals, machinery & equipment	107,8	106,6	104,7	103,6
Metals	114,8	110,4	109,2	105,0
Watch industry	94,8	89,3	93,6	88,2

Table 6* Wages costs = $\frac{\text{Employment x average wages}}{100}$

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
Manufacturing Total	100	107,1	118,1	132,6	144,6	161,3	181,4	176,6	171,9	172,8
Food,beverages,tobacco	100	105,9	114,8	130,0	143,7	163,0	180,7	182,8	183,9	185,1
Textiles	100	107,7	115,5	129,3	136,5	153,9	166,9	152,3	155,4	159,2
Wearing apparel, shoes etc.	100	105,9	114,1	124,0	134,0	143,6	149,5	137,3	135,7	138,8
Wood, cork	100	106,5	116,9	130,5	146,7	164,3	179,8	163,0	153,4	156,6
Paper & paper goods	100	101,8	112,7	125,3	137,2	153,8	177,2	171,4	169,6	171,7
Printing & publishing	100	105,1	112,5	128,5	141,6	156,1	176,6	179,4	177,1	183,2
Rubber, plastics, leather	100	107,5	121,8	134,1	148,0	161,0	175,2	158,8	159,6	160,7
Chemicals	100	115,1	130,7	147,9	170,3	190,7	221,1	231,5	234,3	240,9
Non-metallic mineral products except petroleum & coal	100	102,9	113,5	129,1	143,9	163,7	177,1	160,0	169,5	153,0
Metals	100	107,3	118,6	135,4	156,0	179,0	198,9	186,0	172,4	172,9
Machinery and equipment	100	108,5	121,5	136,6	143,1	156,8	181,3	185,7	181,6	177,3
Watches, jewelry, engraving	100	107,7	119,5	124,9	128,8	145,4	174,1	153,4	143,4	143,8

Table 7* Wage costs per unit of output = $\frac{\text{Wage costs x 100}}{\text{Production}}$

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
Manufacturing Total	100	97,4	99,1	109,0	115,7	123,3	136,9	155,9	148,8	144,4
Food, beverages, tobacco	100	99,9	102,0	110,5	118,1	128,4	149,5	161,2	155,3	151,0
Textiles	100	103,6	113,2	125,5	122,0	135,1	150,5	163,6	146,2	148,4
Wearing apparel, shoes, etc.	100	101,3	109,2	117,8	127,3	141,2	154,9	150,7	122,7	121,6
Wood, cork	100	98,1	101,4	108,8	116,6	120,6	137,8	152,6	145,1	134,8
Paper & paper goods	100	97,9	102,0	121,4	139,4	150,2	158,1	221,4	202,1	188,3
Printing & publishing	100	96,8	95,4	109,0	122,3	135,7	157,4	187,5	185,1	195,1
Rubber, plastics, leather	100	92,5	94,6	103,6	115,4	115,8	130,9	130,1	107,5	96,7
Chemicals	100	93,8	100,9	109,1	118,3	119,3	129,8	160,9	135,7	140,7
Non-Metallic min. prod. except petroleum and coal	100	94,5	97,1	100,4	108,2	117,5	135,9	182,9	193,7	176,7
Metals	100	98,2	99,9	110,6	126,9	134,9	198,9	186,0	170,9	155,5
Machinery & equipment	100	98,6	95,9	105,1	110,8	116,8	129,4	145,6	160,1	150,8
Watches, jewelry, engraving	100	101,9	110,9	119,0	110,7	117,8	138,6	151,1	144,4	136,0

Table 8* Employment by branches, total and different categories of foreign workers

	Employed in Percent of the Total			All Foreign Workers in Percent of those Employed in the Branch				Resident Foreign Workers in Percent of all Foreign Workers in the Branch			
	67	70	76	67	70	73	76	67	70	73	76
1. Manufacturing Total	100	100	100	34,1	35,8	37,0	33,4	14,3	19,3	33,7	51,1
2. Food, beverages, tobacco	7,2	7,1	7,7	31,1	31,5	34,5	30,3	10,1	15,2	26,4	45,2
- Food, animal feed	5,3	5,2	5,9	32,7	32,9	36,5	31,6	9,8	14,4	25,4	43,8
- Beverages	1,1	1,1	1,1	20,3	19,2	20,2	16,9	11,7	20,1	32,0	55,6
- Tobacco	0,8	0,8	0,7	35,2	38,6	41,0	39,9	10,9	16,1	29,0	47,2
3. Textiles	7,5	6,8	6,0	47,8	49,9	50,6	49,5	10,9	15,0	28,4	43,1
- Yarn, thread, fibres	2,6	2,3	2,2	53,7	57,1	57,2	54,9	9,6	12,1	24,2	37,9
- Fabrics	3,1	2,9	2,5	45,5	46,9	48,4	47,1	13,2	11,8	32,4	47,4
- Embroidery	0,5	0,5	0,4	44,3	43,8	41,0	40,6	9,9	12,9	26,7	42,1
- Finishing	1,1	1,0	0,8	44,2	46,4	46,4	45,9	8,9	14,5	29,1	47,2
- Others	0,2	0,2	0,1	32,7	40,3	47,4	52,4	6,1	12,3	28,0	42,7
4. Wearing apparel, shoes,etc.	7,9	7,1	6,0	57,2	60,2	61,9	59,7	8,9	13,2	27,4	40,5
- Shoes	1,6	1,4	0,9	51,5	53,8	53,5	53,0	7,4	11,7	24,5	39,5
5. Wood, cork	5,0	4,8	4,2	33,1	33,5	35,0	29,3	11,9	18,8	34,7	53,0
- Woodwork & wooden semi-manu.	0,9	0,8	0,7	34,7	34,5	34,1	29,3	7,5	12,9	27,0	43,7
- Wood products	0,6	0,6	0,5	31,0	30,2	28,1	24,7	10,0	16,1	30,1	49,7
- Furniture, cons. elements	3,4	3,4	2,9	32,9	34,0	36,4	30,1	13,6	20,5	36,7	55,5
6. Prams, toys, sporting goods	0,2	0,2	0,1	39,0	35,3	21,6	23,3	12,7	12,2	39,0	54,0
7. Paper & paper goods	2,5	2,3	2,5	33,3	35,3	37,4	33,1	13,1	17,5	35,0	52,9
- Cellulose, paper, cardboard	1,1	1,0	1,2	25,8	28,9	32,0	29,8	14,6	18,1	31,8	49,7
- Other paper goods	0,6	0,6	0,7	33,2	35,7	39,0	32,8	16,5	20,8	39,9	58,8
8. Printing & publishing	5,7	6,0	6,1	19,8	21,1	23,0	21,0	22,4	29,6	45,2	62,3
- Book & newspaper printing	4,1	4,1	4,1	16,9	18,4	20,2	20,5	25,3	32,6	46,5	56,2
9. Leather (without shoes)	0,5	0,5	0,4	45,4	45,0	47,8	43,7	11,1	18,3	36,6	55,7
10. Rubber, plastics	1,5	1,7	2,2	37,3	38,5	39,8	34,5	11,9	16,8	33,6	52,1
11. Chemicals	6,4	7,4	9,0	19,8	24,0	28,4	28,4	19,6	21,5	28,9	41,1
- Misc. chemical products	1,6	2,5	5,2	21,0	25,0	30,8	30,9	19,0	20,1	22,4	34,6
- Sythetic & natural dyes	1,3	1,2	0,1	17,9	27,1	33,2	31,2	20,1	15,8	41,6	51,4
- Pharmaceuticals, cosmetics	1,2	1,4	1,7	18,4	21,6	26,1	25,6	25,8	29,3	37,4	47,7

Table 8* Employment by branches, total and different categories of foreign workers

(continued)

	67	70	76	67	70	73	76	67	70	73	76
12. Non-metallic mineral products except petroleum and coal	3,4	3,2	2,7	46,3	46,8	48,4	38,1	9,9	14,0	24,9	49,4
- Artificial stones, cement, gypsum	1,3	1,3	1,1	50,8	52,5	53,9	39,4	7,9	9,7	18,9	45,2
13. Metals	13,6	13,7	13,5	36,1	38,2	38,6	34,7	13,7	19,7	33,0	51,6
- Fabricated metal prod.	5,4	5,5	5,9	35,4	36,4	36,8	33,3	13,2	18,9	35,5	53,9
14. Machinery & equipment	29,9	30,4	32,1	31,8	34,0	34,3	31,0	19,1	23,8	40,3	58,4
- Machines & appliances	24,4	25,9	29,7	32,0	34,4	34,4	31,3	19,3	23,8	40,8	58,8
- Machine tools	2,2	2,3	2,6	26,5	29,9	30,2	28,5	22,0	24,3	44,4	59,0
- Textile machinery	2,1	2,3	3,0	34,1	38,6	40,8	38,0	21,5	24,6	37,4	56,8
- Others	10,7	9,6	12,2	33,7	33,4	33,1	30,5	20,5	24,5	41,3	59,8
- Vehicles, transp.equip.	2,7	2,6	2,3	33,7	33,8	34,8	27,2	17,3	21,5	34,8	53,0
- Repair-workshop	2,8	1,9	0,2	28,3	28,5	27,2	25,9	19,4	27,0	46,3	62,8
15. Watch industry	8,3	8,3	7,0	22,5	27,0	30,4	26,1	13,9	18,6	34,2	55,1
16. Jewelry, engraving	0,5	0,5	0,4	28,4	35,8	38,1	40,4	23,0	23,4	38,9	51,7

Table 8a* Foreign workers in per cent of those employed by branches (A.); and resident foreign workers in per cent of all foreign workers by branches

		68	69	70	71	72	73	74	75	76	77
Manufacturing Total	A.	34,7	35,7	35,8	35,8	36,0	37,0	37,7	35,2	33,4	32,8
	B.	16,4	17,2	19,3	24,2	29,5	33,7	38,4	46,6	51,1	53,9
Food, beverages, tobacco	A.	31,3	31,7	31,5	32,4	32,9	34,5	34,4	32,3	30,3	29,9
	B.	12,0	13,7	15,2	18,3	21,8	26,4	31,4	40,9	45,2	
Textiles	A.	48,7	50,0	49,9	48,8	49,6	50,6	51,4	49,9	49,5	49,7
	B.	12,2	12,5	15,0	20,0	24,6	28,4	33,2	39,9	43,1	
Wearing apparel, shoes	A.	58,2	59,4	60,2	60,3	61,1	61,9	61,6	60,6	59,7	59,3
	B.	10,7	11,6	13,2	17,2	22,7	27,4	32,0	37,8	40,5	
Wood, cork	A.	33,3	33,7	33,5	32,8	33,7	35,0	34,8	31,4	29,3	28,3
	B.	15,5	17,2	18,8	24,7	29,9	34,7	40,0	49,0	53,0	
Paper & paper goods	A.	33,9	34,1	35,3	35,5	35,1	37,4	38,6	36,1	33,1	31,6
	B.	15,3	15,7	17,5	23,4	29,9	35,0	40,5	47,0	52,9	
Printing & publishing	A.	20,3	20,9	21,1	22,2	22,2	23,0	23,4	22,6	21,0	20,4
	B.	26,4	27,7	29,6	34,9	40,0	45,2	50,6	57,2	62,3	
Rubber, plastics (without leather)	A.	37,5	37,2	38,5	37,7	37,2	39,8	41,0	37,5	34,5	34,0
	B.	14,8	15,2	16,8	23,9	28,9	33,6	37,9	47,2	52,1	
Chemicals	A.	21,0	23,4	24,0	25,6	26,2	28,4	30,3	29,6	28,4	27,6
	B.	21,2	20,4	21,5	22,0	24,8	28,9	33,2	37,8	41,1	
Non-metallic mineral products except petroleum and coal	A	46,5	47,4	46,8	47,2	47,9	48,4	47,5	41,3	38,1	37,7
	B.	11,0	12,0	14,0	17,7	21,8	24,9	30,6	43,8	49,4	
Metals	A.	37,0	37,9	38,2	38,1	38,0	38,6	39,7	36,7	34,7	34,5
	B.	15,7	16,4	19,7	24,3	29,4	33,0	37,7	47,0	51,6	
Machinery & equipment	A.	32,7	33,8	34,0	33,8	33,6	34,3	35,3	33,2	31,0	30,1
	B.	21,4	21,7	23,8	29,9	36,1	40,3	44,1	52,5	58,4	
Watches (without jewelry, engraving)	A.	23,6	25,5	27,0	27,8	28,3	30,4	33,1	28,8	26,1	26,6
	B.	16,3	17,9	18,6	23,0	30,0	34,2	37,3	47,9	55,1	

Table 9* Export prices

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
1. Food, beverages, tobacco	100	103,7	109,4	111,2	105,6	96,4	99,2	96,7	99,5	101,0
2. Textiles, wearing apparel	100	101,2	102,7	102,1	100,4	104,5	118,9	108,2	103,2	105,1
a. Fibres	100	96,2	93,6	80,9	82,3	97,9	118,5	84,3	83,6	86,5
b. Yarns	100	102,1	99,4	94,7	84,5	86,6	101,9	82,0	80,4	80,3
c. Fabrics	100	101,4	103,7	108,5	110,6	119,1	137,1	129,9	118,0	121,3
d. Wearing apparel	100	101,1	103,3	104,1	105,8	105,0	109,3	106,4	100,4	102,9
e. Shoes, accessoires	100	101,1	104,7	104,9	111,2	112,4	124,2	129,5	126,3	136,2
3. Textiles (2.-(2d.+2e.))	100	101,2	102,5	101,6	99,1	104,0	119,8	107,2	102,2	103,4
4. Wearing apparel, shoes (2d.+2e.)	100	101,1	103,9	104,4	107,9	107,7	114,2	113,6	108,4	113,6
5. Paper & paper goods, printing & publ.	100	103,4	107,6	113,4	113,9	113,8	126,5	129,2	125,4	122,8
- Cellulose, pulp	100	111,1	138,1	114,5	109,0	136,6	240,5	134,8	145,4	127,6
- Paper, cardboard	100	107,2	114,7	115,1	119,4	121,8	145,4	158,3	144,2	135,1
6. - Printing & publishing	100	102,8	103,8	114,4	114,5	111,2	111,4	117,9	118,9	121,1
7. Paper and paper goods (5.-6.)	100	104,1	112,6	112,1	113,1	117,0	140,5	141,2	130,9	124,2
8. Leather, rubber, plastics	100	103,5	102,4	108,0	112,7	117,2	122,3	116,0	112,5	112,6
9. Chemicals	100	99,0	101,4	100,9	107,4	102,3	114,9	117,8	116,8	115,5
- Basic industrial chemicals	100	94,6	93,9	92,7	100,6	86,1	104,8	111,9	107,3	101,1
- Tanning materials, dyes	100	98,7	105,2	110,0	114,0	116,9	129,9	135,9	130,6	131,6
- Pharmaceuticals	100	104,1	111,4	111,4	119,5	126,1	131,6	125,3	122,5	130,4

Table 9* Export prices

(1968 = 100)

(continued)

	68	69	70	71	72	73	74	75	76	77
10. Non-metallic mineral products except petroleum & coal	100	103,5	106,2	112,2	116,1	121,4	128,2	138,0	134,3	131,4
11. Metals	100	104,6	112,9	113,0	112,2	117,0	135,3	134,4	126,2	129,6
- Fabricated metal goods	100	100,3	104,7	111,2	113,0	114,9	127,9	134,2	126,2	130,4
12. Machinery and appliances	100	99,4	107,0	113,2	124,3	132,8	143,7	157,8	164,4	165,7
13. Vehicles, transport equipment	100	103,5	112,6	119,0	143,0	144,6	157,0	140,2	180,2	194,1
14. Machinery and equipment (12.+13.)	100	99,5	107,1	113,3	124,7	133,0	143,9	157,2	165,0	166,8
15. Precision instruments, optical appliances, watches, jewelry	100	106,7	106,5	113,6	116,6	127,9	159,2	164,4	154,9	164,4
16. - Watches	100	105,6	108,3	113,0	113,0	123,2	143,3	154,6	153,0	152,7
17. Furniture	100	100,4	107,2	110,7	114,7	118,4	124,1	122,7	120,0	121,2
18. Other wooden manufactures	100	95,6	101,1	106,7	107,3	125,1	154,1	136,3	134,7	140,7
19. Wood, cork (17.+18.)	100	97,2	103,3	108,2	110,1	122,6	142,7	131,2	129,5	133,3
20. Total	100	101,6	105,6	109,4	114,6	118,1	133,5	137,4	136,4	138,9

Table 10* Import prices

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
1. Food, beverages, tobacco	100	105,2	109,3	116,1	123,2	134,9	149,7	150,5	135,6	142,4
2. Textiles, wearing apparel	100	100,6	102,4	102,5	104,4	109,0	118,6	108,2	100,7	109,5
a. Fibres	100	100,9	97,8	94,9	95,8	113,0	137,7	101,7	105,1	114,2
b. Yarns	100	96,6	93,6	91,4	84,5	88,9	100,0	86,6	85,0	87,6
c. Fabrics	100	101,6	102,2	102,0	103,1	107,1	117,3	107,9	98,4	106,7
d. Wearing apparel	100	100,5	103,6	104,5	107,8	109,1	115,3	107,3	98,1	108,3
e. Shoes, accessoires	100	101,4	109,4	110,4	114,4	120,1	126,5	128,7	116,6	129,1
3. Textiles (2.-(2d.+2e.))	100	100,5	101,0	100,7	101,9	107,6	118,5	105,5	99,2	106,9
4. Wearing apparel, shoes (2d.+2e.)	100	100,8	105,7	106,5	110,0	112,5	118,9	113,8	103,7	114,7
5. Paper & paper goods, printing & publishing	100	101,7	108,8	112,6	111,2	111,3	133,8	145,7	135,9	131,4
- Cellulose, pulp	100	106,0	122,0	127,2	117,7	115,2	158,8	179,4	163,2	145,0
- Paper, cardboard	100	98,8	102,0	104,3	102,3	103,0	128,5	136,2	120,7	116,9
6. - Printing & publishing	100	104,0	113,0	119,8	122,0	123,4	136,0	150,7	150,3	149,4
7. Paper and paper goods (5.-6.)	100	100,3	106,5	108,5	105,0	104,9	132,7	142,6	128,5	122,1
8. Leather, rubber, plastics	100	100,9	101,1	100,0	103,1	105,9	120,4	117,2	111,5	116,3
9. Chemicals	100	99,4	102,4	103,7	100,5	101,2	134,3	129,0	119,1	121,5
- Basic industrial chemicals	100	97,3	99,0	100,2	96,1	98,8	142,8	133,1	121,3	121,9
- Tanning materials, dyes	100	99,8	106,5	106,8	97,2	97,7	115,1	121,2	115,3	121,7
- Pharmaceuticals	100	103,9	117,4	124,8	121,7	106,3	118,2	120,1	114,3	121,4

Table 10* Import prices

(1968 = 100)

(continued)

		68	69	70	71	72	73	74	75	76	77
10.	Non-metallic mineral products except petroleum and coal	100	103,5	108,6	113,7	117,6	119,4	130,2	127,9	123,2	128,7
11.	Metals	100	108,7	127,2	118,3	114,9	124,4	149,7	141,2	129,5	130,5
	- Fabricated metal goods	100	103,6	113,0	115,9	117,9	120,2	130,1	133,1	124,4	129,4
12.	Machinery and applicances	100	102,3	110,3	113,8	118,9	119,1	127,0	130,9	128,3	134,7
13.	Vehicles, transport equipment	100	98,0	105,5	109,3	118,9	121,1	129,4	134,4	137,7	142,3
14.	Machinery and equipment (12.+13.)	100	101,5	108,9	112,9	118,9	119,5	127,4	131,5	129,8	135,9
15.	Precision instruments, optical appliances watches, jewelry	100	98,8	95,9	80,1	86,0	99,8	125,8	123,0	97,3	111,9
16.	- Watches	100	105,2	110,6	112,4	118,7	135,6	164,9	162,1	149,4	147,1
17.	Furniture	100	104,4	111,2	112,0	114,3	116,5	124,1	122,2	111,3	119,1
18.	Other wooden manufactures	100	105,0	111,7	115,8	118,7	131,8	150,6	138,4	134,4	143,5
19.	Wood, cork (17.+18.)	100	104,8	111,5	114,0	116,5	123,8	135,9	128,0	119,8	128,6
20.	Total	100	101,8	108,2	109,4	111,3	118,8	141,5	136,5	129,2	137,0

Table 11* $\frac{\text{Wage costs per unit of output x 100}}{\text{Export prices (X) Import prices (M)}}$

(1968 = 100)

		68	69	70	71	72	73	74	75	76	77
Manufacturing Total	X	100	95,9	93,8	99,6	101,0	104,4	102,5	113,5	109,1	104,0
	M	100	95,7	91,6	99,6	104,0	103,8	96,7	114,2	115,2	105,4
Food, beverages, tobacco	X	100	96,3	93,2	99,4	111,8	133,2	150,7	166,7	156,1	149,5
	M	100	95,0	93,3	95,2	95,9	95,2	99,9	107,1	114,5	106,0
Textiles	X	100	102,4	110,4	123,5	123,1	129,9	125,6	152,6	145,1	143,5
	M	100	103,1	112,1	124,6	119,7	125,6	127,0	155,1	147,4	138,8
Wearing apparel, shoes, etc.	X	100	100,2	105,1	112,8	118,0	131,1	135,6	132,7	113,2	107,0
	M	100	100,5	103,3	110,6	115,7	125,5	130,3	132,4	118,3	105,8
Wood, cork	X	100	100,9	98,2	100,6	105,9	98,4	96,6	116,3	112,0	101,1
	M	100	93,6	90,9	95,4	100,1	97,4	101,4	119,2	121,1	104,8
Paper & paper goods	X	100	94,0	90,6	108,3	123,3	128,4	112,5	156,8	154,4	151,6
	M	100	97,6	95,8	111,9	132,8	143,2	119,1	155,3	157,3	154,2
Printing & publishing	X	100	94,2	91,9	95,3	106,8	122,0	141,3	159,0	155,7	161,1
	M	100	93,1	84,4	91,0	100,2	110,0	115,7	124,4	123,2	130,6
Leather, rubber, plastics	X	100	89,4	92,4	95,9	102,4	98,8	107,0	112,2	95,6	85,9
	M	100	91,7	93,6	103,6	111,9	109,3	108,7	111,0	96,4	83,1
Chemicals	X	100	94,7	99,5	108,1	110,1	116,6	113,0	136,6	116,2	121,8
	M	100	94,4	98,5	105,2	117,7	117,9	96,6	124,7	113,9	115,8
Metals	X	100	97,9	95,4	99,5	111,9	117,4	155,5	138,6	135,4	119,2
	M	100	94,8	88,4	95,4	107,2	112,2	152,9	139,7	137,4	120,2
Machinery & equipment	X	100	99,1	89,5	92,8	88,9	87,8	89,9	92,6	97,0	90,4
	M	100	97,1	88,1	93,1	93,2	97,7	101,6	110,7	123,3	111,0
Non-metallic mineral products except petroleum and coal	X	100	91,3	91,4	89,5	93,2	96,8	106,0	132,5	144,3	134,5
	M	100	91,3	89,4	88,3	92,0	98,4	104,4	143,0	157,2	137,3
Watches, jewelry, engraving	X	100	96,5	102,4	105,3	98,0	95,6	96,7	97,7	94,4	89,1
	M	100	96,9	100,3	105,9	93,3	86,9	84,1	93,2	96,7	92,5

Table 12* Volume of exports

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
1. Food, beverages, tobacco	100	114,0	128,1	136,9	126,2	142,4	134,3	134,7	144,2	164,8
2. Textiles, wearing apparel	100	114,3	120,2	129,8	143,4	151,7	143,4	136,2	161,3	173,1
a. Fibres	100	115,3	97,8	123,6	136,1	140,7	118,2	106,7	145,9	150,2
b. Yarns	100	113,7	131,8	151,1	185,5	189,6	175,6	185,8	215,1	216,5
c. Fabrics	100	112,6	114,7	120,5	133,5	141,6	125,6	107,3	137,3	152,1
d. Wearing apparel	100	12[illegible],7	141,6	155,7	162,5	177,1	187,1	190,5	226,8	251,0
e. Shoes, accessoires	100	110,5	107,5	113,6	102,6	99,3	88,6	84,8	100,1	117,3
3. Textiles (2.-(2d.+2e.))	100	113,7	119,4	128,9	145,5	154,3	144,5	136,0	161,0	171,1
4. Wearing apparel, shoes (2d.+2e.)	100	117,5	124,4	134,3	132,3	134,7	137,4	137,2	162,9	183,6
5. Paper & paper goods, printing & publ.	100	111,1	120,2	129,5	152,3	175,8	210,3	166,8	182,8	211,3
- Cellulose, pulp	100	120,0	117,5	98,1	104,2	119,3	131,3	112,1	114,1	135,0
- Paper cardboard	100	110,0	110,9	130,2	158,0	200,4	301,4	199,2	257,5	311,5
6. - Printing & publishing	100	106,8	123,3	132,9	158,3	174,0	182,4	154,5	150,2	171,9
7. Paper and paper goods (5.-6.)	100	116,5	116,3	125,3	144,8	178,1	245,2	182,2	223,6	260,7
8. Leather, rubber, plastics	100	112,9	123,6	126,5	146,6	159,8	179,6	170,7	207,7	252,9
9. Chemicals	100	122,8	131,8	141,6	155,2	178,9	198,2	173,4	193,2	206,5
- Basic industrial chemicals	100	131,5	142,1	157,4	176,3	226,6	242,2	211,7	248,4	277,8
- Tanning materials, dyes	100	114,7	121,8	134,5	149,7	165,9	168,7	113,9	152,1	142,5
- Pharmaceuticals	100	110,7	114,8	115,8	119,4	125,5	145,8	140,8	151,0	157,8

Table 12* Volume of exports

(1968 = 100)

(continued)

	68	69	70	71	72	73	74	75	76	77
10. Non-metallic mineral products except petroleum and coal	100	114,4	118,3	117,3	118,5	130,5	154,4	136,6	148,3	180,6
11. Metals	100	114,4	118,3	117,0	133,3	154,4	170,7	160,6	194,8	227,6
- Febricated metal goods	100	120,8	134,8	134,8	146,9	170,8	184,8	180,2	214,6	252,7
12. Machinery and equipment	100	118,5	125,1	128,8	125,8	139,4	146,8	138,1	138,3	156,4
- Machinery and appliances	100	118,4	125,3	128,7	126,1	140,2	147,4	141,2	141,5	153,5
- Vehicles, transport equipment	100	113,8	114,0	134,1	112,1	106,0	118,6	229,4	253,2	282,4
13. Watches	100	101,3	104,7	101,3	107,8	113,3	111,4	87,6	86,7	95,5
14. Wood, cork	100	98,4	101,1	107,4	115,0	140,8	154,5	164,2	234,2	285,9
- Furniture	100	138,2	155,8	168,2	181,9	219,9	248,4	259,2	353,7	454,1
- Other wooden manufectures	100	86,1	84,2	88,6	94,2	116,3	125,5	134,7	197,1	233,8
15. Total	100	113,5	120,8	124,4	131,6	146,1	152,7	140,2	156,4	174,9

Table 13* Volume of imports

(1968 = 100)

	68	69	70	71	72	73	74	75	76	77
1. Food, beverages, tobacco	100	106,7	116,0	121,6	129,2	131,9	121,9	108,0	116,4	117,6
2. Textiles, wearing apparel	100	119,5	132,8	145,6	162,8	178,5	176,5	154,7	183,5	190,2
a. Fibres	100	99,9	101,9	100,4	108,0	121,9	98,0	91,3	116,2	111,3
b. Yarns	100	125,2	149,0	151,9	159,0	180,9	162,7	123,6	156,3	169,5
c. Febrics	100	107,4	110,3	123,6	141,1	162,7	163,8	128,5	146,2	153,3
d. Wearing apparel	100	129,7	147,9	170,7	194,1	210,1	218,9	206,1	245,9	254,.
e. Shoes, accessoires	100	129,2	144,5	155,1	172,8	165,6	180,6	155,6	186,3	197,4
3. Textiles (2.-(2d.+2e.))	100	115,8	127,7	138,5	154,2	172,9	166,1	142,7	168,7	174,5
4. Wearing apparel, shoes (2.-3.)	100	129,5	146,7	165,0	186,3	193,8	204,9	187,7	224,1	233,4
5. Paper & paper goods, printing & publ.	100	116,5	134,4	130,4	146,9	163,0	168,3	132,0	149,9	161,7
- Cellulose, pulp	100	113,3	144,1	112,4	131,0	159,2	167,0	134,7	137,6	162,8
- Paper, cardboard	100	128,4	150,8	148,4	165,0	183,6	197,6	129,4	171,0	174,7
6. - Printing & publishing	100	105,1	113,4	114,9	128,9	136,5	131,1	120,9	123,2	132,7
7. Paper and paper goods (5.-6.)	100	124,6	149,3	141,4	159,6	181,7	194,6	139,8	168,8	182,2
8. Leather, rubber, plastics	100	116,6	130,6	143,5	155,6	167,8	164,9	124,3	146,9	167,8
9. Chemicals	100	119,6	138,1	145,0	158,0	176,1	187,2	148,1	177,1	191,2
- Basic industrial chemicals	100	122,4	145,4	149,3	160,0	179,2	189,4	147,8	183,0	193,2
- Tanning materials, dyes	100	118,4	140,3	150,2	217,3	242,5	266,1	172,2	203,4	228,1
- Pharmaceuticals	100	115,8	120,9	131,6	131,9	157,6	167,2	148,9	160,7	179,8

Table 13* Volume of imports

(1968 = 100)

(continued)

	68	69	70	71	72	73	74	75	76	77
10. Non-metallic mineral products except petroleum and coal	100	113,2	130,9	141,8	165,7	177,8	171,6	132,6	137,8	153,3
11. Metals	100	122,0	143,7	136,5	142,2	153,0	158,6	107,8	116,1	139,2
- Fabricated metal goods	100	117,7	141,2	152,3	154,5	170,2	179,7	130,4	134,8	161,9
12. Machinery and equipment	100	114,6	138,7	145,8	154,3	160,3	160,3	124,4	127,4	145,6
- Mechinery and appliences	100	117,8	144,9	150,3	161,6	167,0	173,9	129,7	137,0	156,1
- Vehicles, transport equipment	100	103,0	116,7	129,6	128,3	136,3	111,6	105,4	92,8	107,8
13. Watches	100	121,3	147,7	160,1	151,4	185,4	206,9	152,6	182,6	196,9
14. Wood, cork	100	115,0	135,2	142,1	166,3	185,1	176,4	125,4	140,0	158,0
- Furniture	100	113,7	134,6	162,5	197,4	230,6	233,9	190,4	210,9	229,6
- Other wooden manufactures	100	115,9	135,7	127,3	143,8	152,2	134,9	78,3	88,7	106,1
15. Total	100	114,8	132,5	139,3	149,5	158,4	156,1	129,1	146,6	161,5

Table 14* Gross value of production (prices of 1970) in billion Swiss francs and export (X) and imports (M) in constant prices as percentages of gross value of production, 1967-1977

		67	68	69	70	71	72	73	74	75	76	77
Food, beverages, tobacco		13,738	14,325	15,185	16,130	16,846	17,434	18,178	17,319	16,245	16,961	17,562
	M		13,37	13,46	13,77	13,82	14,19	13,90	13,48	12,73	13,14	12,82
	X		7,19	7,77	8,18	8,37	7,48	8,07	7,99	8,54	8,76	9,67
Textiles		3,493	3,676	3,824	3,750	3,787	4,114	4,188	4,077	3,423	3,908	3,944
	M		42,79	47,66	53,59	57,54	58,97	64,95	64,11	65,57	67,90	69,58
	X		40,15	43,89	47,00	50,26	52,21	54,40	52,33	58,66	60,81	64,04
Wearing apparel, shoes, underwear		3,222	3,278	3,425	3,425	3,451	3,451	3,333	3,163	2,986	3,625	3,740
	M		17,50	21,69	24,56	27,42	30,96	33,35	37,15	36,04	35,46	35,79
	X		8,58	9,65	10,20	10,94	10,78	11,63	12,22	12,92	12,64	13,80
Paper and paper products		1,434	1,471	1,529	1,625	1,518	1,447	1,506	1,649	1,138	1,234	1,342
	M		29,30	35,11	39,59	40,12	47,55	52,01	50,87	52,96	58,95	58,52
	X		10,54	11,81	11,10	12,79	15,51	18,33	23,05	24,82	28,09	30,10
Printing and publishing		2,651	2,901	3,150	3,420	3,420	3,359	3,336	3,255	2,776	2,776	2,715
	M		10,51	10,18	10,11	10,25	11,71	12,48	12,29	13,29	13,54	14,91
	X		6,69	6,5[illegible]	7,00	7,54	9,15	10,12	10,88	10,80	10,50	12,29
Leather, rubber, plastics		1,197	1,154	1,341	1,485	1,493	1,479	1,604	1,544	1,409	1,713	1,917
	M		65,23	65,45	66,20	72,35	79,20	78,75	80,40	66,41	64,55	65,89
	X		25,55	24,83	24,50	28,98	29,18	29,37	34,30	35,72	35,74	38,89
Chemicals		6,040	6,645	8,153	8,605	9,010	9,568	10,618	11,323	9,562	11,476	11,376
	M		30,81	30,01	32,86	32,95	33,70	33,96	33,85	31,71	31,60	34,41
	X		52,86	52,90	53,80	55,20	56,97	59,18	61,48	63,69	59,13	63,76
Non-metallic mineral products except petroleum and coal		2,010	2,066	2,250	2,415	2,657	2,748	2,878	2,692	1,808	1,808	1,789
	M		21,19	22,03	23,73	23,36	26,40	27,05	27,91	32,11	33,37	37,52
	X		5,31	5,58	5,37	4,84	4,73	4,98	6,29	8,29	9,00	11,08

Table 14* Gross value of production (prices of 1970) in billion Swiss francs and export (X) and imports (M) in constant prices as percentages of gross value of production, 1967-1977

(continued)

		67	68	69	70	71	72	73	74	75	76	77
Metals		11,082	11,171	12,210	13,260	13,671	13,785	14,824	14,411	11,171	11,272	12,422
	M		18,90	21,09	22,88	21,08	21,78	21,79	23,23	20,37	21,74	23,66
	X		11,90	12,45	11,86	11,37	12,85	13,84	15,74	19,11	22,97	24,35
Machinery and equipment		14,588	15,635	17,199	19,810	20,326	20,200	20,998	21,905	19,935	17,730	18,387
	M		26,92	28,04	29,48	30,19	32,16	32,13	30,80	26,26	30,23	33,32
	X		35,20	37,91	34,74	34,88	34,27	36,54	36,87	39,52	44,69	46,81
Watches, jewelry, musical inatruments		5,495	5,613	5,933	6,015	5,894	6,534	6,927	7,050	5,697	5,574	5,933
	M		2,13	2,45	2,95	3,26	2,78	3,21	3,52	3,21	3,93	3,98
	X		44,74	48,87	43,45	43,16	41,43	41,07	39,68	38,61	39,06	40,42
Wood, cork		3,638	3,781	4,107	4,360	4,538	4,757	5,150	4,935	4,039	3,997	4,394
	M		14,85	15,71	17,41	17,58	19,63	20,18	20,06	17,43	19,67	20,19
	X		3,70	3,36	3,25	3,32	3,39	3,83	4,39	5,70	8,21	9,12
Total		67,256	70,721	77,794	84,300	86,068	88,402	92,504	93,706	80,127	81,683	84,653
	M		24,26	25,32	26,97	27,77	29,02	29,38	28,58	27,64	30,79	32,73
	X		25,92	26,74	26,30	26,49	27,28	28,95	29,87	32,07	35,09	37,87

Billions (1000 millions) to 3 decimals; the commas represent decimal points.

Table 15* Real trade balances as percentage of the gross value of production at 1970 prices by branches, 1968-1977

	68	69	70	71	72	73	74	75	76	77
Food, beverages, tobacco	- 6,18	- 5,69	- 5,59	- 5,45	- 6,71	- 5,83	- 5,49	- 4,19	- 4,38	- 3,15
Textiles	- 2,64	- 3,77	- 6,59	- 7,28	- 6,76	-10,55	-11,78	- 6,91	- 7,09	- 5,54
Wearing apparel, shoes, underwear	- 8,92	-12,04	-14,36	-16,48	-20,18	-21,72	-24,93	-23,12	-22,82	-21,99
Paper & paper products	-18,76	-23,30	-28,49	-27,33	-32,04	-33,68	-27,82	-28,14	-30,86	-28,42
Printing & publishing	- 3,82	- 3,60	- 3,11	- 2,71	- 2,56	- 2,36	- 1,41	- 2,49	- 3,04	- 2,62
Leather, rubber, plastics	-39,68	-40,62	-41,70	-47,37	-50,02	-49,38	-46,10	-30,69	-28,81	-27,00
Chemicals	22,05	22,87	20,94	22,25	23,27	25,22	27,63	31,98	27,53	29,35
Non-metallic mineral products except petroleum and coal	-15,88	-16,45	-18,36	-18,52	-21,67	-22,07	-21,62	-23,82	-24,37	-26,44
Metals	- 7,00	- 8,64	-11,02	- 9,71	- 8,93	- 7,95	- 7,59	- 1,26	1,23	0,69
Machinery and equipment	8,28	9,87	5,26	4,69	2,11	4,41	6,07	13,26	14,46	13,49
Watches, jewelry, musical instru.	42,60	40,42	40,50	39,90	38,65	37,86	36,16	35,40	35,13	36,44
Wood, cork	-11,15	-12,35	-14,16	-14,26	-16,24	-16,35	-15,67	-11,73	-11,46	-11,07
Total	1,66	1,42	- 0,67	- 1,28	- 1,74	- 0,43	1,29	4,43	4,30	5,14

APPENDIX 3

Appendix to Part V

Characteristics of Products Produced in Developing Countries Outside Europe According to an Investigation of 14 Annual Reports for 1976 and Two Special Company Publications

Food

The annual report for Nestlé records which products groups are produced in which countries and how many factories exist in each country. It appears that a wide range of products is often produced in the developing countries. This impression is supported by the publication "Nestlé in the developing countries", in which production in tons is given for each individual country per product group up to 1974. As well, information is given on the use of local raw materials and imported raw materials. In the case of Brazil, which has the greatest proportion - with about 24% - of the total production (in tonnage) among the developing countries, all the typical Nestlé product groups are represented:

	Brazil % Proportion of the Total
Milk Products	62.7
Instant and Dietetic Products	14.3
Instant Drinks	7.7
Chocolate, Biscuits	11.4
Culinary Products	1.4
Frozen Foods and Ice Cream	2.5
Total	100.0

But there are also countries in which only one signle product is produced, for example, condensed milk in Thailand. Nestlé characterises its activities in the following way: "...the very nature of Nestlé

activities in the developing countries (is the) local processing of a raw material, the supplies of which the country strives to increase in quality and quantity . . ." The fact that the imports of raw materials amount to a total of only about 14% of the local raw material purchases (in Brazil, only 3%) supports this assertion.

The Sibra 1976/77 report shows that beer and non-alcoholic drinks are produced in Senegal.

In neither of these two examples taken from the food industry could one properly speak of a shift of production from Switzerland to developing countries, nor of a loss of production opportunities inside Switzerland. The products in question are not suited to massive exporting from Switzerland: the inadequate raw material supply and/or high transportation costs, i.e. the natural location factors, hardly allow large scale production in Switzerland for the world market.

Metals and Machinery

The Alusuisse report shows the following distribution of products and industrial activities in the developing countries:

-extrusions and castings in Brazil
-bauxite, alumina and mining in Guinea
-hollow-ware, light structures and extrusions in Nigeria
-bauxite in Sierra Leone

Brown Boveri's report gives the following details on goods production in developing countries:

—in Brazil
-transformers and furnaces
-rotating machines
-500 KV high-voltage airblast circuit-breakers (partly manufactured locally for the first time)
-switchgear and electrical equipment
-insulating material

--Mexico

-induction furnaces to be installed in a large foundry

--Peru

-transformers

-electrical equipment for a paper mill

--Venezuela

-substations of 400/230/115/kV serving three power stations

-electronic protection systems for power distribution networks

--Argentina

-gas turbines

-electrical equipment for power station

-co-operation with licensees extended by agreements for the manufacture of airblast switchgear up to 550 kV

-direct current machines.

The Georg Fischer report records a 25% share in an automatic loom works company in India, as well as a new joint venture in plastic products in Saudi Arabia.

Hermes Precisa International mentions that it produced Hermes Baby typewriters in Brazil.

The Oerlikon-Bührle report metnions that there is a subsidiary in Argentina producing gears and cog-wheels as well as automobile accessories and components for forges. The organizational overview in the annual report shows that production by other companies of the Bührle group in developing countries is mainly in the field of welding (electrodes).

Schindler's report shows that of 38 subsidiaries with production facilities, 21 are located outside Switzerland and 5 of these in developing countries. Production in developing countries is exclusively in the elevator sector. Under a special heading "Schindler in Asia" it is mentioned that production of cabins and doors for the standard type elevators started in Iran in 1974.

"Ciba-Geigy undertakes research also in the Third World for new specific products . . . The application of adapted technologies . . . offers opportunities for labour intensive processes . . ."

The Sandoz report mentions the following major developments:

-plant for large-scale manufacture of copper based fungicides completed in Brazil.

-manufacturing of industrial chemicals to start in a joint venture in Venezuela.

-increase in capacity of formulation facilities in India and Turkey.

-work begun on installation of a packaging plant for Ovaltine in Nigeria.

In the Roche report there is an overview showing that of 12 foreign subsidiaries producing chemicals, 3 are located in developing countries; of the 24 foreign subsidiaries producing pharmaceutics 11 are in developing countries, and of the 14 producing perfumes and flabours 4 are in developing countries.

The chemical industry's production in developing countries does not appear to be primarily one of basic chemicals. But as in the case of machinery, a closer analysis of just where on the product cycle these goods lie is hardly possible from annual reports. One can, however, venture the surmise that transport costs and the location of raw materials are if anything an even less important consideration than for the machinery industry. Sales orientation and, recently, the effects of the exchange rate of the Swiss franc are probably the decisive location factors.

Non-metallic Mineral Products Except Petrol and Coal

Holderbank's report indicates that with the exception of Costa Rica, cement is the only product produced in the developing countries. In Costa Rica, concrete pipes, concrete bricks and components, reinforced concrete, and artificial stone tiles are also produced.

From Sulzer's annual report one sees that there is a pump factory in Brazil, where orders for large pumps are dominate. In additi n, there are subsidiaries in Argentina and Brazil with activities in the areas of heating and airconditioning technology. In Mexico there is a further subsidiary active in the field of pumps. (From the context, one can infer that in all three cases it is a question of production and not just of selling and servicing.)

In the case of machinery, production in the developing countries has to do with "product-cycle" goods; but in which range of the maturity curve these goods belong cannot be determined on the basis of the annual reports. The reasons for redeployment seem primarily to have been sales-orientation to local and neighbouring markets. The availability of cheaper labour takes second place. Recently, the exchange rate of the Swiss franc has been an additional incentive. Transportation costs seem to be a minor factor and the location of raw materials, more or less irrelevant. In the case of metals (Alusuisse), the orientation to raw materials and transport costs are predominant, however.

Chemicals

The Ciba-Geigy report shows that all major product divisions have production sites in the developing countries, though naturally to a varying degree. The following are some note-worthy details:

-acquisition of a significant holding in a Brazilian seeds firm.
-multipurpose plant for stabilizers and an expoxy resin plant brought into operation in Brazil.
-construction of new pharmaceutical production plant in process in Brazil.
-construction of a new dyes plant begun in Argentina.
-joint venture for the manufacture of pharmaceuticals established in Iran.

The following passage is taken from the firm's new publicati on about its activities in the developing countries ("Ciba-Geigy in Entwicklungsländern"):

Shoes

The 1976/77 annual report shows that Bally is involved in tanning and the production of chemicals in Brazil and Argentina.

Raw materials and transport costs are decisive location factors in the cases of both Holderbank and Bally, but with Holderbank there is also a linkage to the local construction sector.

Plans and Intentions of Individual Firms Relevant to Production in the Developing Countries: Information from the NZZ (April-June 1978)

In 1977 Nestlé acquired the American Alcon Laboratories Inc. Among the motives for this step is the following: creation of counter-weights in the highly industrialized countries - market economy countries - to an otherwise ever increasing dependence on production in the politically and economically unstable oountries of the Third World.

Alusuisse is increasing internationalization of its services potential; negotiations for co-operation with an Indian engineering firm are far advanced. The firm is seeking better distribution of real capital between hard and soft currency countries and to bring the share in the USA up to 50%, for example.

More than a third of Brown Boveri's (BBC) orders come from the Third World. BBC intends to further strengthen its presence in developing countries; the company to be established in Saudi Arabia may, besides marketing, assemblage and maintenanoe, take up local production of switchgear etc.; exploratory talks with Iran concerning the establishment of an electro-technical firm; another manufacturing projeot in Peru in advanced stages of negotiations (electrical machines - generators, motors, etc.).

Through participating in the Fundisao Munck foundry, Georg Fischer has the possibility of becoming increasingly active in South America; despite the conviction that production in Switzerland has a future, locations are also to be developed in other countries, with priority to USA and Japan.

Hermes aims to redeploy production in part to other countries. The factory in Brazil is to be further enlarged and co-operation with the Hungarian licensed partner will be extended.

Oerlikon-Bührle intends to give more attention to research and development in all branches, in particular, in order to raise the competitive capacity of production locations in Switzerland and Liechtenstein.

After the successful joint venture in Egypt, Schindler has further such projects planned or underway.

SSIH (Société Suisse pour l'Industrie Horlogère) is internationalizing production in cases where price plays a decisive role; participation in watch firms in Brazil is being investigated.

Sulzer is extending existing production facilities in Brazil cautiously and step by step; the lion's share of investments does not go to foreign countries; there is great emphasis on maintaining jobs in Switzerland and on rationalized, many sided and modern production inside Switzerland.

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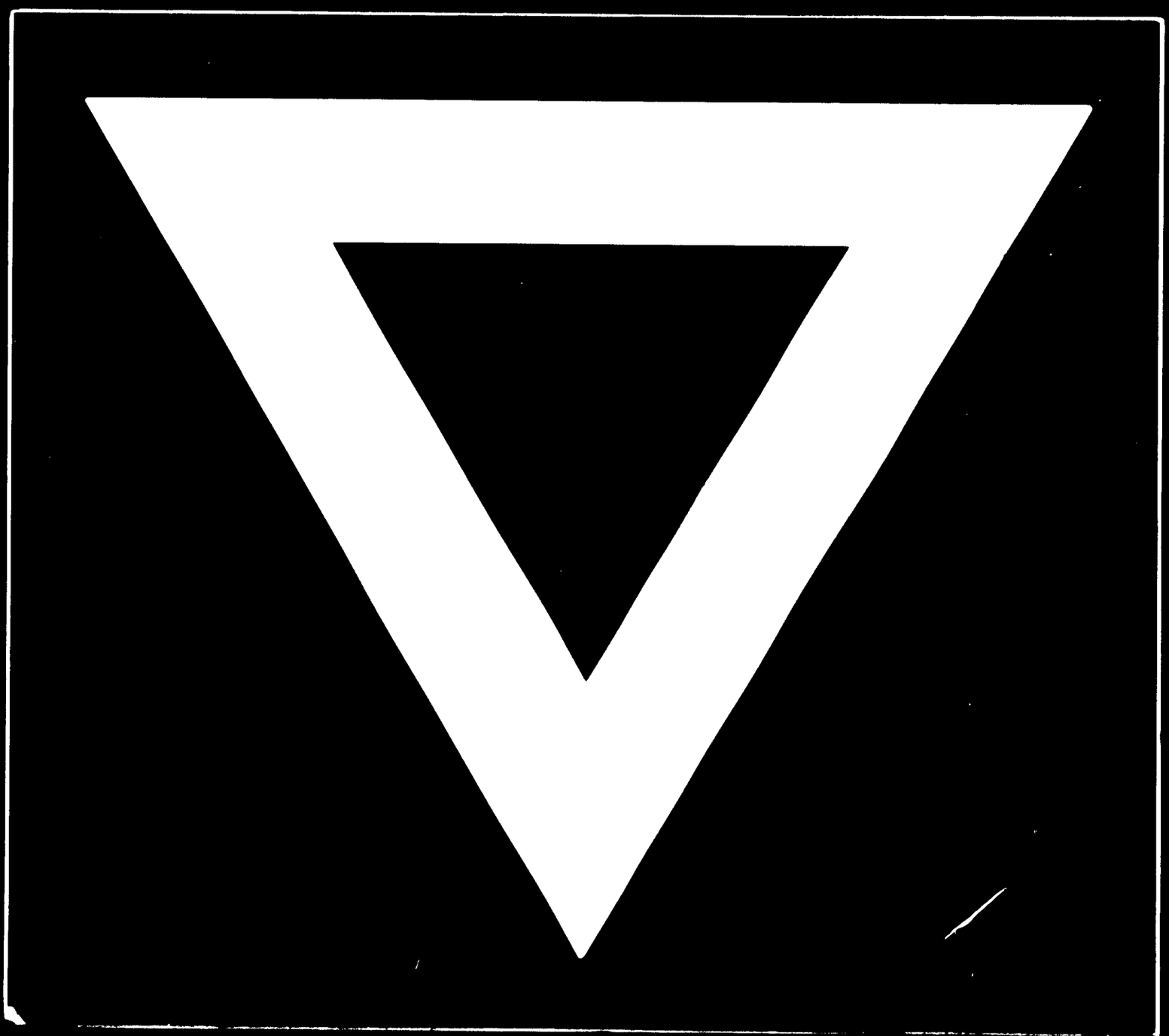

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