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RECENT DEVELOPMENTS IN THE MACHINE TOOL INDUSTRY IN ASIA: THE PROSPECTS FOR FOREIGN DIRECT INVESTMENT AND THE SITUATION OF SRI LANKA

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UNIDO Project UC/SRL/86/002

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Preface

Under its terms of reference this report is required to tackle three issues which are only loosely related among themselves. The government of Sri Lanka requested UNIDO to look at the possibilities of attracting foreign investment in machine tools (MT) to the island. The request appears to have been prompted essentially by the government's interest in expanding and diversifying (branch-wise) the inflow of foreign direct investment (FDI). But since Sri Lanka does not already possess an MT industry, has a metal-working branch of only limited range, and is not pursuing a programme designed to establish a dense inter-industry network which could provide significant internal demand for MT products, any FDI would have to be of a piecemeal type with a high proportion of the output directed to export. Since the country's primary economic objective at present seems to be the expansion of export earnings this outcome would be acceptable - but is it at all feasible given the state of the world MT industry? To respond to that question the report begins with an assessment of the current international market, underlining its highly competitive nature, the enormous increase in Japan's role and the general trend towards an 'Asia centred' market, the diffusion of electronic-based control technology, and the persistence of a small group of industries (especially the automotive cluster) as the principal source of demand. The report then proceed to ask whether the international character of the industry as evidenced by the relatively high ratios of exports to production and imports to consumption for most of the leading producer nations is paralleled by a similar emphasis on FDI. Up till now the answer is firmly in the negative; however, in view of the growing pressures to limit MT imports to the US market as shown by the US administration's partially successful attempts to obtain Voluntary Export Restrictions (VER) from Japan, Federal Republic of Germany (FRG), Switzerland and Taiwan Province of China, the report goes on to consider whether and in what ways that answer might be modified in the future.

The first two-thirds of the document are thus MT focussed; a switch of perspective is unavoidable in evaluating the position in Sri Lanka. The next part therefore looks at manufacturing industry within the economy and in particular the post 1977 stress on exports. A sketch is made of the institutional cum economic factors which have encouraged the export oriented investments and some simple comparisons are made of Sri Lanka with other Asian countries as a site for new FDI. How does the FDI outlook relate to metalworking and MT in Sri Lanka? The next section tries to answer the question as a prelude to a summary of the linkages between the three pivots of the report viz. MT, FDI and Sri Lanka's prospects in manufacturing investment.

Prefatory comment would be incomplete without an obvious caveat. The report is based on a short period of 'desk research' only - there were no opportunities for field work either in Sri Lanka itself or elsewhere (especially interviews and plant visits with OECD companies). Whatever could be gathered by correspondence and telephone contact with interested parties was done but such information hunting represents only the initial part, a

clearing of the decks, for more company oriented work. There is considerable scope and need for an examination of the FDI issue in MT, looking at advanced technology metal cutting tools on one side and certain aspects of metal forming tools on the other. Analysis of this kind would perforce include market survey type data and technology transfer arrangements, both areas which up to now have been neglected. For an industry repeatedly labelled as the core of capital goods, the anatomy of MT remains surprisingly opaque.

Chapter I: An Overview of the Machine Tool Industry

I.1. Defining the Subject

More than most industrial branches MT is defined in different ways according to the purpose at hand. The Japan Machine Tool Builders Association (JMTBA) simply describes MT as "machines for making other machinery equipment"[1/]. A UNIDO analysis tries to be much more precise stating "A machine tool is a power-driven tool, non-portable while in operation, used for carrying out, individually or in combination, the operations of machining, forming and electrochemical processing of metals, wood, glass, plastic and similar materials."[2/] It goes on to note the wide range of MT encompassed by the definition, ranging from simple drilling machines and lathes to machining centres with tool changers and flexible machining systems, and the set of operations involved in metal cutting and metal forming that give rise to hundreds of different kinds of MT. Quantitative studies usually confine themselves to ISIC major groups 381 and 382 and/or divisions 71-74 of SITC, though sometimes the apparent rigour is weakened by references to non-electrical machinery. Whatever the details the points to be kept in mind are (i) MT are tools for making machines and/or components of machines, (ii) their power source can be mechanical or electrical, (iii) although mostly references are to working on metals, the materials so fashioned can be quite diverse, and (iv) the huge differences in complexity of manufacture and operation mean that MT can be made in highly advanced factories or in simple workshops.

Nowadays the production of an advanced MT (itself made by using other MT) draws not only on the traditional (yet ever more sophisticated) disciplines of metallurgy and mechanics but increasingly on electrical science and above all electronics. Indeed, the chairman-designate of Brown Boveri has recently indicated that the electrical-electronic component in MT manufacturing costs is in the region of 30%.[3/] This shift in the nature of the product is, within the main OECD countries, altering the character of the industry and the activities of the firms within it. Leading firms now engage in substantial buying-in of components, especially electronic control systems, must use large teams of design engineers including computer software specialists to solve problems for their clients (packaged solutions), make sizeable Rand D expenditures, and produce a wide range of items (coverage of product series seems to be a key factor in market success). Yet the industry still retains remarkable heterogeneity with respect to firm size and technological vintage of production methods and outputs - which suggests that any country trying to attract FDI in the branch has many different segments to look at. Where it concentrates its efforts will depend on what kinds of items it wants to manufacture, for which markets, and capitalising on which local resources.

MT output does not represent more than a small fraction of manufacturing value added (MVA) in any country. Table 1 illustrates this point using 7 major countries. It shows that machinery and equipment industries account for just under one-half of MVA in the leading OECD countries as against just under 30% in the leading developing countries; that about two-fifths of machinery output tends to come from metal products and non-electrical machinery; and that, as indicated by the footnote figures for Japan, MT output is usually not more than about one-tenth of the latter category. In relation to MVA, therefore, the share of MT is probably around 2% for the leading OECD countries and from 1-1.5% for the leading developing countries. In absolute terms MT is a much smaller activity than most of those which have been in the

forefront of FDI during the past decade and its importance, as is well known, derives from the strategic nature rather than the absolute value of its output. The strategic significance, in its turn, stems from the pivotal role played by the branch in relation to other major industries within the producing countries. Up till now there is no instance of a country which has engaged in notable MT production without having a sizeable and diversified industrial structure.

I.2. Machine Tool Production

The overwhelming majority of world MT output originates in some 35 countries - Table 2 summarises the 1986 data (in dollar terms, the highest ever recorded value of production). Total output is around $29 billion of which some 77.5% stems from cutting tools. Seven countries, 5 OECD and 2 Eastern Europe, produce in excess of $1 bn. each and together they account for 79% of the global total - the 8 leading developing countries, including China, only manufacture just over 5% of the global figure. Combining table 2 with table 3 demonstrates that, while concentration of world production is on the increase, there has been a dramatic shift in the relative strength of different producers. In 1976 some 57% of the aggregate figure came from the 4 chief producing countries whereas by 1986 their share was just over 64%. In the former year, however, each of the other leaders produced more or less double the Japanese figure (then around 8% of world output); by 1986 Japan manufactured more MT than the USA and USSR combined. Even when allowance is made for the large rise in the value of the yen during the latter year, Japan still remains clearly ahead of both countries individually (though not combined).

The world production map has now become multi-centred but with striking tendencies in the shifts in the balance of power. Four areas are currently high profile producers: (i) the 12 European members of CECIMO, providing around 37% of global output - within which FRG is by far the dominant entity and Switzerland and Italy, both specialist suppliers, rank next; (ii) Asia, with some 30%, of which Japan provides four-fifths but China, Taiwan (Province of China), Republic of Korea and India also each produce about 1% of the world total; (iii) Eastern Europe, with close to one-fifth the global figure, mainly from USSR and GDR; and (iv) USA and Canada, around 11% of the total. That spread of output is radically different from the mid 1970s and even from the start of the present decade as Japanese production has expanded enormously (some six and one-half times measured in current exchange rates and about 5 times at constant rates) and US output has dropped from a peak of close to $5 bn. in 1980 to a total less than $3.0 bn. in 1986. How can the changes be explained and what do they imply?

Japan's move to dominance is the result of macroeconomic and MT specific factors. The macroeconomics of sustained growth at home plus huge export demand abroad have fuelled consumption of MT - the character of demand has been strongly oriented, both within Japan and elsewhere (especially USA), to items whose production processes depend heavily on MT investment. Outstanding among these branches has been automotives: "The industry and its related contractors and sub-contractors account for up to 50% of the output of machine tools in Japan."[4/] Export sales of automobiles, along with direct exports of MT, have ensured that a large part of the demand for Japanese MT production has come, directly and indirectly, from abroad: taking this along with persistent high rates of growth at home within an economy strongly oriented to industry as the leading sector has provided a constant and powerful impetus on

the demand side. Yet this factor alone is insufficient to explain the force of Japan's MT production surge - due to the successful incorporation of technological advances emanating from electronics, the quality of output has changed dramatically over the past decade.

More than any other country in the world, Japan has emphasised production of numerically controlled (NC) MT and particularly computer numerically controlled (CNC) items. A few quantitative indicators underline the extent of Japan's commitment to improved production quality. Table 4 describes the principal kinds of MT production in Japan in 1985 and shows how total output and NC output were distributed by type of MT. NC production was two-thirds of the total and within the NC column machining centres and lathes absorbed 69% of the aggregate, with electric discharge machines (EDM) and special purpose items pushing the total up to around 90% of all NC products. These are precisely the kinds of equipment in heavy demand throughout the OECD in the current era of revolutionising the factory, of custom-made large-scale output. Tables 5 and 6 illustrate Japan's concentration on NCMT as compared with other countries. In Table 5 the flow and stock position in 1985 is set out for the 3 leading OECD producers and 2 key developing countries in Asia. On an annual output basis Japan puts a far larger share of its resources into NC production than do any of the other countries - at the moment two-thirds by value of MT manufacture in Japan is NC while in both FRG and USA the share is not above 30%. That the high proportion has been maintained for some years is demonstrated by the stock data (computed on a unit basis) in the right-hand column of Table 5 which shows that, as the Japanese producers themselves say, the country is now in the 'one in four' period - a quarter of all MT installed are of the NC type. Although no reliable data for FRG and USA could be found, there can be little doubt that the shares in these countries are far below the Japanese figures.

Table 6 highlights the position with regard to one of the most important sets of MT developed in the past years, CNC lathes. Using 3 areas, Japan, USA and the leading West European countries (excluding only Switzerland among significant producers), the table sets out the shifts in their relative production shares, by value and volume, over the years 1976-1984. From a mid 1970s position where Europe and USA dominated in value terms and Japan's output was worth less than a fifth of the total, the rise of Japan to 1984 could scarcely have been more rapid. At that date over one-half of the value of CNC lathes production (measured at current exchange rates) came from Japan; even with currency conversion at 1976 rates, the 5 West European countries together (with a market around 250 million people) were only barely in advance of Japan. On a volume basis Japan has always been in the forefront; nevertheless, it has continuously increased its share of world output to reach close to three-quarters by now.

It can legitimately be argued that the disparity between value and volume figures is appreciable; Table 7 gives average $ prices in 1984 for NC cutting machines and shows US made items selling at double Japanese prices and FRG machines at half as much again compared with Japan. While exchange rate alterations over the past 18 months along with a relative upgrading of Japanese production have certainly narrowed the average price differentials, it is still most probably true that the US and FRG figures exceed those for Japan. Now the relevance of price comparisons is this: for MT, relative prices are fairly closely correlated with relative quality (price tends to reflect weight, and weight itself is a fair approximation for machine power). The mix of Japanese NC output is thus towards smaller items than those made by

its competitors: within Japan itself, and above all internationally, the thrust has been towards the less than top size NCMT and this market segment seems to have been very large. To a considerable degree, Japan has created it and captured it.

Thus the contours of the present world production structure. But are the developments of recent years likely to be a reliable pointer to the remainder of the decade? As with some other, related, industrial branches a crucial element affecting the competitive struggle in the near future is the trade situation between Japan and USA. Since about 14% of the former's production is sold in the American market, application of sharp trade limitations could shift market shares and encourage reactions by Japanese firms. Foremost among those responses would most probably be FDI: Chapter II will examine the evidence on this point. Production relocation is, however, only part of the picture. The size and geographical origin of demand, as well as the fluctuations in it, will have a major influence on production shares. MT are producer durables purchased as part of the investment decision in other branches: the sustainable annual rate of demand is therefore a function of investment cycles, the economic life of MT (which in periods of rapid technical progress depends as much on the real productivity of new vintages of equipment as on physical wear and tear) and the prospects of extending MT use into completely new areas. To explore these issues a little further the following sub-section looks at consumption trends.

I.3. Machine Tool Consumption

Table 8 sets out apparent consumption (production less the trade balance, thus leaving aside any movement in stocks) in 1986 for the 6 major markets (sales in excess of $1 bn.), the 4 leading developing countries in Asia as well as Brazil and Mexico. The world's top 4 industrial countries stand out on this index - they absorb some 60% of global output. The inversion in the rankings as compared with production for USA and USSR on one side and Japan and FRG on the other reflect the trade patterns for the countries, as will be shown in the next sub-section. The leading Asian countries together currently invest in some $1.7 bn. worth of MT per annum; if Japan and the whole of the rest of Asia are added in the region's aggregate demand is running at (as an absolute minimum) $6.5 bn a year, or a little more than 20% of global use

Demand for MT is strongly cyclical in character. In the absence of adequate time series for sales the changes in world output, set out in Table 3 above, can be taken as a proxy. They show that the past decade splits into 3 sub-periods. From 1976 to 1980 the year on year shifts were all positive and generally well in excess of 10% (the simple average was +18.7%); 1980-1983 was a phase of output falls averaging close on 10% per year; while the last 3 years recorded another upswing, above all in 1985-1986 when output rose by one-third. The annual absolute shifts (i.e. ignoring the sign of the change) varied substantially among the leading countries, averaging around 29 percentage points in Japan, 20 each in FRG and USA, and a bit over 9 in USSR. Three of the four had 8 rises and 2 falls while for FRG the split was 6:4 so the evidence of quite sharp annual changes is pretty clear (even at constant exchange rates the Japanese figure would be high as witnessed by the fact that the latest annual shift, the 12 months in which the biggest alteration in the $ to Yen rate has occurred, is not much above the average).

An industry with these features is very likely to exhibit periods of over and under capacity in production, accompanied by pronounced swings in

utilisation rates, and probably by changes in stocks and occasional price wars. These points will certainly be put into sharper relief when product quality is altering rapidly due to technical change - an ongoing process of major industrial reorganisation is found within as well as among the top producers. While complete evidence, in the form of detailed series of figures by country, is hard to come by, illustrative data abound. In Japan the slowing down of new plant investments (abroad as well as at home) and model retooling by the automotive producers, along with the trade tensions vis-á-vis the US, are taking their toll. An end 1986 survey by the Japan Machinery Exporters Association (JMEA) revealed that some 76% of the firms interviewed were finding the present situation hard to handle, with the scope for further reductions in operating costs very limited. Big MT firms such as Mori Seiki, for whom exports to USA have reached 60% of output, as well as many smaller ones drawn into production during the boom years, will all find the situation tough. It was reported by MITI at end 1986 that orders were 20% down as compared with a year earlier and a large-scale reorganisation of the branch seems unavoidable.

FRG producers had an extremely difficult time during the first half of the present decade, when many collapsed completely. The companies which have done well have been forced into massive (relative to output) investments and highly selective product strategies often involving an effective withdrawal from the volume end of MT production. Deckel, for example, which has around 50% of the FRG market in its principal products (universal milling and boring machines) tripled capital spending from 1984 to 1986 and has pushed the NC proportion of its output to 85% today as against some 30% at the start of the decade. The story in the UK is one of massive shifts which are by no means finished. For CNC lathes, of which the UK market is about 1800 units per annum, more than 100 companies offer products but one firm, TI, currently makes above half the total. Yet the early 1987 opening of the Yamazaki plant at Worcester bodes an immense upheaval in that market. When full scale production is achieved (scheduled for early 1988) 1200 CNC lathes and machining centres per annum are expected and TI, despite taking record orders of some $38 mn. in 1986, is already indicating the likelihood of selling off the whole MT business. Since the Yamazaki plant managers nevertheless say that about 80% of output will be exported, the shock waves will spread to other EEC markets. "The market is suffering from vast over-capacity and persistent discounting by certain Korean, Taiwanese and Japanese producers of 15 per cent to 30 per cent below list price."[5/]

The preceding comments have made no reference to upheavals within USA where MT demand has been strong yet domestic output is well down on the levels attained at the beginning of the decade. To understand this better and indeed obtain a full map of competitive tensions in the industry an examination of trade patterns is required.

I.4. International Trade in Machine Tools

The earlier sections of this chapter have brought into relief the striking changes in production and consumption, driven by investment cycles and technological innovation, which continue to redraw the world MT map. International trade flows are the clearest index of the relative positions of countries - Table 9 brings together, for the main producing countries listed in Table 2, the 1986 ratios of exports to production, imports to apparent consumption, and net trade to gross trade. Looking at the first column shows that for all the main OECD and East European countries (with the exception of

the Soviet Union) the share of output sold abroad is high by any standards. The proportion is lowest in the USA yet even there is close to one-fifth; for the rest it ranges from a little more than two-fifths (Japan) up to nearly 90% (Switzerland). By combining the second column with the first the extent to which MT is characterised by intra-trade can be seen. With the exception of Japan, where imports meet barely one-twentieth of local demand, the import to apparent consumption share exceeds 30% for every country of weight in the OECD and Eastern Europe. For the smaller producers of specialist items (Switzerland, Sweden) import shares are about 70%; the UK and France are not much different; and foreign produced MT now account for almost one-half US consumption.

The trade balance in relation to overall trade brings out the significance of these shares. Among the world's top 7 production locations, the USSR and USA are very heavy importers while the rest have strong positive balances (ratios from near 50% to above 80%). The negative balance picture carries over to UK and France and is even marginally the case for Sweden, generally reckoned as a quite successful specialist manufacturing base and a quite rapid innovator and user of foreign innovations. Given that a major part of East European trade tends to be within the region, the USSR and GDR figures largely cancel out each other; consequently the present pattern within the OECD emphatically points to USA as the dominant absorber of exports stemming from the 4 producers with high positive ratios of net to gross trade. As this development has become particularly pronounced within the past 2 - 3 years it is not surprising that the current position is fraught with tensions.

Where do the developing countries stand in trade? For the 7 key countries listed the findings reveal a very mixed set of situations. On the export to production and net trade to gross trade indicators, Taiwan (Province of China) stands out from the rest. It exports $7 in every $10 produced and, notwithstanding an import/consumption ratio that is not small, has a positive balance that compares very favourably with the leading OECD exporters. All other countries have negative balances: Brazil has an overall participation in trade that is low compared with any other country listed (even the Soviet Union) but the rest have large negative accounts. For India and Republic of Korea their industrialisation thus makes relatively heavy use of imported MT despite the stress laid by both countries, albeit in different ways, on strengthening domestic production capabilities. These data suggest that the trade picture raises rather separate questions for the developing countries and the OECD. In the former case the problem is how to use imports to reinforce local capabilities whereas in the latter the current emphasis is towards not only developing an export industry but also ensuring domestic output will meet the demands posed by a total reorganisation of manufacturing. This sub-section looks first at the OECD situation and then the position of the developing countries.

Just as in automotives, so in MT the key market towards which all producers in this strongly trade oriented branch have been pulled is USA. Earlier tables have shown how the aggregate value of US imports has risen; Table 10 provides a breakdown by origin for benchmark years over the past decade. There is both continuity and change. In 1976 FRG and Japan dominated as sellers - during the next 10 years their grip has been strengthened but with a major reversal of roles as Japan alone has, since the start of the 1980s, taken close to half the US import market. This does not mean that the product composition of Japanese exports has been unaltered. As of now, for

example, Japan has a more than 70% share of the whole US market (i.e. including domestic output) for NC lathes and machining centres and about a 45% share of the market for punching and shearing tools. In 1981 the percentages were 50 and 19 respectively - the Japanese trade thrust has switched rapidly and decisively to NC items. The UK share is now down to half of its 1976 level while Switzerland and Italy, having lost ground through the 1970s, are now slightly stronger than a decade ago: Taiwan, Province of China, has now reached fourth place among foreign suppliers, enough to give it the double-edged distinction (as will be seen below) of joining Japan, FRG and Switzerland as VER targets.

To look at OECD trade flows from the other side, Tables 11, 12 and 13 provide the 1985/1986 breakdowns by destination of MT exports for Japan, EEC and Switzerland respectively. Japan is both much more dependent on the US market than other exporters and yet more diversified in the destinations of its trade. Two thirds of foreign sales go to the OECD with the US/Europe ratio standing at 2:1. For EEC producers there is first the fact that few exports go to Japan (certainly less than 5% of the total), second that 15% only go to North America as a whole, and third that intra-trade among Community members, at just under one-third of total exports, is perhaps less intense than might be expected. Indeed Switzerland, selling half its exports to the EEC, is the trader with by far the heaviest reliance on the EEC: its relative sales to USA are at about the same level as those of the Community.

Although a fully disaggregated country breakdown could not be obtained, the evidence indicates that Asian countries probably absorb around 17-18% of Japanese MT exports and perhaps some 13% of those from EEC. Given the current boom in world MT trade the absolute size represented by those shares is by no means negligible; and if most forecasts of comparative regional growth rates for industry over the next few years are to be believed, that market is likely to be one of the fastest expanding. The question that will be tackled in the next chapter will relate to the Asian countries as a production location rather than only an export market and thus to the possibility that they could be employed as sites from which to assemble and export MT to other countries as well as increasing domestic self-sufficiency (measured in the crude sense of locally manufactured MT to total consumption). But if the OECD market for exports becomes still tighter the Asian countries (excluding Japan) would probably become a major arena for competition amongst manufacturers and a flurry of activities, ranging from trade through FDI to technology transfer arrangements of various kinds, might well be on the cards. Where those deals would be located and what they would comprise is very much an open question.

The data on trade patterns hints at another aspect of MT market behaviour on which only sparse information could be obtained yet which may be of appreciable importance. Japan's rise in the US market over the past decade, along with the mix of regions to where foreign sales have been directed, demonstrates that a successful internationalisation of its activities has occurred. But that success is due not only to performance as a producer - in MT, as elsewhere, the global reach of marketing has been great. Marketing has been handled not only by producer companies themselves but also by the famous trading houses: while it is true that the 10 largest Japanese MT manufacturers account for about one-half of output, are strongly export oriented and probably do most of their own marketing, the aggregate export bias of the industry means that a sizeable share of exports must come from small to medium size firms which draw on the Soga Shosha as marketers. A good part of the opening up of markets, particularly to relatively small and maybe

'one-off' buyers, must certainly be put to the credit of the trading houses. Furthermore, as mentioned earlier, the last 5 years have seen substantial automotive FDI by Japanese firms, especially in USA, and this has brought MT exports through the well established ties in Japan itself of the automotive producers and MT suppliers. The demonstration effects of these plants have not been confined to the much vaunted management and organisation abilities of Japanese producers (c/f the Honda plant in Tennessee) but have spread also to being showcases for Japanese MT. This form of advertising, by exhibiting the product in action, has certainly added to the marketing impact. Allied to the powerful network of JETRO offices to be found in all major and a large number of (as of now) minor markets, the FDI in associated branches along with the efforts of the trading houses offer extensive opportunities for even fairly small producers to find export opportunities. Given that some 69% of the 113 JMTBA members are small to medium size firms (as measured by employees),[6/] the multi-dimensional marketing effort is probably a major factor in export sales.

Switzerland has been a successful exporter with a similar production structure (108 producing firms, few multinationals, an average payroll of less than 130 employees) but without other aspects of the recent Japanese push. But in this case the emphasis on highly specialised MT has certainly been an advantage. In 1986 the average price per metric ton of exported MT was above SFr. 50,000 as against an import price of SFr. 24,000 while Table 14, using comparative 1981 and 1985 data, shows Switzerland to be very much the high price bracket producer. Undoubtedly the country's general image as a top quality supplier of all goods and services has assisted marketing and contributed to the willingness of buyers to accept even long lags in delivery - at end 1986 there were various instances of 14 to 18 month quoted lags being accepted by foreign firms wishing specifically to buy Swiss MT. For a top quality producer and a quality volume producer, therefore, the marketing dimension almost certainly plays a powerful role in the internationalisation process.

As mentioned briefly earlier on in this chapter, the trade position may now be at a turning point due to developments in the US market. In 1986 that country alone absorbed about 23% of world imports (excluding USSR) - and towards the end of that year demanded introduction of VER by Japan, FRG, Switzerland and Taiwan, Province of China. That accent was on rolling back market shares. Specifically, Japanese sales of NC lathes and machining centres were to be put back to the 1981 level of 50% and shearing and punching equipment back to 19%, with the pact to last 5 years. Similar product targetting can be found in the 5 year agreement with Taiwan, Province of China. For conventional lathes the market share would be limited to 24.7% (as against a recorded figure of 29.7% in 1985): for NC lathes, 3.2%; for conventional milling machines, 19.3%; and machining centres, 4.7%. These figures are indeed revealing. Not only are ceilings introduced against sales of conventional products where low cost, efficient production has been built up, but there is advance protection against 'quota hopping' in more sophisticated MT i.e. efforts by Japanese and other producers to relocate to Taiwan, Province of China, as a device for reducing the impacts on themselves of a VER regime. Certainly this does not prevent production relocations elsewhere but the US calculation is presumably that other sites would be a good deal less attractive (meaning, among other things, that production of the more advanced MT is unlikely to be a footloose activity).

It appears that Japan and Taiwan, Province of China, have accepted the

VER and negotiations with FRG may have been partially successful. But Switzerland has categorically refused to come to any arrangement. "Berne turned the request down point-blank and subsequently said it would not consider a proposed ceiling on numerically-controlled cutting and punching units as binding and threatened to 'take steps' if Washington acted unilaterally to restrict deliveries."[7] The impact of the VER policy is unclear and that for several reasons. First, the restraints are set in terms of shares of the US market and the overall behaviour of that market is hard to predict. Second, experience with VER where shares are computed in relation to numbers of units sold shows that the scope for upgrading of product quality is normally well used by exporters. Third, the extent to which VER will actually be observed is open to considerable doubt. Fourth, there remains space for production relocation, both to USA and elsewhere, which could ensure that import shares of the American market continue to rise. What the VER approach does signify, however, is a strong warning to foreign producers; their future production and investment strategies will certainly not rely so heavily on sales to USA. The FDI implications will be examined in the next chapter.

The trade circumstances of the leading developing countries are quite different. In Latin America the foreign exchange shortages must certainly have contributed to limiting imports as well as curtailing local output (shortages of components): thus in Mexico, despite the very high import to consumption ratio, the current level of new investment in MT is extremely low while in Brazil apparent consumption has been severely squeezed and imports kept to a low share of the aggregate. But in Asia the position differs enormously as the leading developing countries have pressed on with industrial investment and sought to upgrade their MT stock. In Taiwan, Province of China, MT was designated a 'strategic industry' in the early 1980s and received development subsidies from the government along with increased tariff protection in those areas where it was felt local firms could improve their capabilities quickly if some limited (in extent and duration) protection could be given against low cost imports.[8] India launched a decade long plan for sectoral development in 1984 aimed strongly at the CNC segment of the industry. But it was clearly foreseen that intensified imports would be necessary to assist improvement of local capabilities as well as to fill the multifarious gaps in existing local production; in arranging its policy this way India was following its traditional approach towards reinforcing local skills (an approach which, however, has had mixed results in other industrial branches).[9] An attempt to diversify imports by source has been made but the suppliers list does not differ so markedly from that of OECD countries i.e. in 1984 around two-thirds by value of all imports came from FRG and Japan with Switzerland, USA, Uk, Czechoslovakia and GDR as the other significant sources. Grant of import licences is gradually veering to NC/CNC items though in the main categories of import the shift is not especially quick. Thus a disaggregation of 1984 MT imports by volume and value of each product shows that 289 grinding machines were imported of which 9 were NC/CNC, 181 lathes were purchased of which 93 were NC/CNC, 124 presses of which 5 were NC/CNC, 97 boring machines of which 12 were NC/CNC, and 87 milling machines with 5 of them being NC/CNC.

With the exception of Taiwan, Province of China, the crucial questions of trade for developing countries pertain to import strategies rather than export markets. But the growing conflicts over world markets, along with the price cutting now taking place and the pressures for reorganisation, both of industrial structure and production location, mean that the developing country situation is affected by the fierce competition among leading firms. This is

why a fairly complete account of that competition has been necessary.

I.5. Summary of Recent Trends and the Questions Posed

MT output and employment is but a tiny portion (rarely above 2%) of machinery and equipment industries in the world's main industrialised countries. Yet it is a pivotal branch, being the provider of key capital goods. Demand for its output is therefore closely linked to investment cycles in major industry sectors of the OECD. Over the past decade 3 phases are clearly discernible viz. 1976-1980, 1981-1983 (sharp contraction) and 1984 - 1986; there are good reasons for thinking another sharp change is now occurring but this time with different structural features than in the past. The decade has witnessed a dramatic rise to the top of Japan as a producer and exporter, due to sustained domestic economic growth, the MT demand generated by the country's FDI (above all in automotive) and the speed with which it has innovated in NC and CNC production. While USA has remained very much the key open market it has, in the 1980s, suffered an astonishing collapse as a domestic producer. The speed of import penetration appears to have brought matters to a crisis point and VER negotiations have been partly concluded with major sellers. The ramifications of the immense competitive strains are several including (in addition to trade controls) problems of overcapacity, falling profits, possible relocation of production through FDI and/or technology transfer arrangements, and product choice (what items to specialise in). Since MT manufacture today requires much greater skills than the traditional areas of metallurgy and mechanics, drawing heavily on electronics in the vital area of control systems, and many products are made by highly automated processes which utilise quite intensively the skills of the information sciences, there is a virtual rupture with the metalworking sector. For small to medium size countries placing considerable emphasis on export oriented industrialisation as a main plank of development, yet still lacking a wide industrial base and without adequate domestic demand to sustain one, the natural temptation is to ask whether the present conjuncture could offer the chance to link up with MT production through FDI. Chapter II assesses the significance of foreign investment in this branch and the factors influencing developments in the rest of the 1980s; that serves to round out the international context facing Sri Lanka, whose own position is the subject of Chapter III.

1/ JMTBA, Machine Tool Industry Japan 1986.

2/ UNIDO, Technological Perspectives in the Machine Tool Industry and their Implications for Developing Countries.

3/ See Financial Times, "Machine Tools: Rich Pickings in Specialisation," 27 April, 1987.

4/ Far Eastern Economic Review, "Rationalisation is on the Cards for a High Flyer," 18 December, 1986.

5/ Financial Times, "Machine Tool Makers face Cut-Throat Competition," 24 April 1987.

6/ The size distribution in 1985 was as follows: less than 49 employees, 11.2%; from 50 to 99, 17.8%; from 100 to 299, 40.1%; from 300 to 499, 10.3%; from 500 to 999, 13.1%; and above 1000, 7.5%.

7/ Financial Times, loc. cit. footnote 3/ above.

8/ For a few details see Martin Fransman, "International Competitiveness, Technical Change and the State: The Machine Tool Industry in Taiwan and Japan," World Development, December 1986.

9/ The Perspective Plan schedules a 1992 production of 800 NC/CNC machines, equivalent to 25% of total output for that year; in 1985 local manufacture was 65.

Chapter II: Foreign Direct Investment - A Response to Competitive Pressures

II.1. Machine Tools and Foreign Direct Investment

This report began by emphasising the small size of the MT branch in relation to engineering industries as a whole. It would, therefore, not be surprising if FDI in MT were but a small fraction of overall external investment by the leading countries. In fact available data are generally not sufficiently disaggregated to permit MT investments as such to be identified; instead, figures usually relate to the much broader categories of machinery and, to encompass metalworking, fabricated metals. Tables 15-18 set out the pertinent information for USA, Japan, FRG and UK respectively. For both USA and Japan the 1985 stock position could be obtained, in FRG the 1984 stock and for UK the cumulative investments for the 5 years 1980-1984 inclusive; in addition Table 15 also provides 1985 net flow data for USA.

The tables highlight several key points. First, manufacturing FDI is notably less than half the total for all 4 major investors, lying in the 40-45% range for USA, FRG and UK and below 30% for Japan with its well-known concentration on natural resources. Second, the stock of FDI in the broad category of machinery industries (or mechanical engineering in the cases of FRG and UK) is not a large share of the manufacturing total; the US figure at almost 20% is more than double the shares in each of the other 3 investors where the proportion is in the 8-9% range. Given that MT is but a part of the machinery industries the supposition must be that, on a stock basis, the US is the only country where past FDI in MT may have been more than one or two per cent of the manufacturing aggregate. Third, the shares of machinery investment going to developing Asia have been small save for Japan; while close to 50% of that country's FDI in machinery has gone to its neighbours, the Asia figure for the others is around 3% or less. Fourth, the combination of the 3 preceding points strongly suggests that, up till now, MT has not been a sector notable for FDI and that, within such MT investments as may have occurred, Asia has not been a major recipient (the likelihood is that the EEC may have been the key area). Fifth, the bracketed figures in each row of Table 16 are revealing about Japan's FDI. On a global basis around half of the investments were made during the first half of the present decade yet for Asia the proportion tended to be around 40% (although it did exceed one-half specifically in the machinery sector). On the whole, then, the trend in recent years is away from Asia. The 1985 flow data for USA, presented in Table 15, tend to reinforce the point as they note that, though net machinery investments abroad were at the comparatively high rate of 41% of all manufacturing (double the same ratio for existing stock), FDI in developing Asia was negligible.

Information released for 1986 FDI flows of FRG points in a similar direction.[1/] It shows net worldwide FDI of DM 11.2 bn. (some 18% down on 1985) with only 6.1% going to developing countries (as recently as 1983 their share had been 30%); although a precise figure for developing Asia is not available, the data do allow a 'ceiling' to be put on the share - it could not have exceeded 2%. On a sector basis the engineering industry share was only just over 5%, a finding of particular interest since vehicle manufacture, at almost 20%, was much the most important sector. It may be that the purchase of MT to support FDI in vehicles was reflected in FRG exports - at the moment the evidence points to an MT trade effect rather than an MT investment effect of the automotive international investment process.

The evidence so far has concentrated on MT investments in relation to other industrial branches and shown them to be tiny. It might reasonably be argued that a better measure of the industry's 'propensity to invest' is a comparison of FDI with total investment or total output in the branch, calculated on an annual basis. Now comparable numbers of this type could not be obtained so the best that can be offered is a very rough approximation drawing on such figures as do exist. For Japan in 1985 production of metal cutting MT was of the order of 10% of output of all industrial machinery: if the same proportion holds for FDI then about $220 mn. was invested globally in metal cutting MT by Japanese firms in 1985. In the same year Japan produced $4.4 bn. of metal cutting MT; taken together these figures would put the FDI to current output ratio at about 5%. Using similar computations for USA that same ratio comes to around 4.8% so we might take a 4.5 to 5% figure as being about the right order of magnitude for the relation between FDI and current output in MT at the moment. Compared with the automotive industry of the first half of the 1980s this ratio is low as it is against data for most branches of electronics and electrical equipment, not to mention areas which have traditionally been at the core of FDI in manufacturing e.g. textiles, garments and food processing.

Some further evidence on the role of FDI in MT up till now is given in Table 19, which tries to ascertain what has been the FDI behaviour of German firms drawing on information for the whole period 1961-1983. Though the definitions employed in the basic data bank are not as precise as they might be, the material suggests that 3.2% of all recorded cases of FDI were related to MT. Less than one-tenth of these (13 cases) were in developing Asian countries while about three-quarters went to the 4 countries traditionally important to the FRG i.e. USA, Brazil, Austria and Switzerland. The data show that in one-half of the instances wholly owned affiliates were formed and in only 20% of the cases did minority owned JVs result. There is some evidence of an acceleration in FDI during recent years with an annual rate of some 8 or 9 cases prevailing since 1976. Although no monetary figures to measure firm size are given, the data on employees exhibits a clear inverse trend - the larger the firm the fewer the number of cases. Interestingly enough the tendency is pronounced for USA but not so for Brazil (by far the major developing country recipient of FRG investments). Using the same cross-comparisons the relative incidence of minority owned JV is much higher in developing country FDI than in USA but, importantly, the frequency of investments in the 1980s is considerably greater for USA.

Admittedly the evidence on patterns of FDI in MT by the leading OECD producers leaves plenty of gaps and tentative conclusions could be overturned by more adequate information. That said a sketch of the situation would be as follows. MT is only a tiny sector in absolute terms for FDI and the bulk of that investment has been emphatically towards EEC and USA; very little has gone to developing Asia. The propensity to foreign investment of MT producers suggests the sector has, up till now, not been strongly oriented in this dimension. There is, in short, a dramatic contrast between the internationalisation of MT as measured by the degree of intra-trade among producers and the still circumscribed extent of FDI. The partial data currently available further indicate biases towards the OECD main centres (excluding Japan) in recent investments along with a tendency to put cash into wholly owned affiliates there of small size. By any measure developing Asian countries have been on the margin in activities of the last few years; such fragments of information as can be assembled strongly suggest that, within developing countries as a whole, the preferred areas for foreign investors

would be those countries already having strong industrial structures and a clear commitment towards upgrading of technologies i.e. Brazil, Republic of Korea, Taiwan (Province of China), Singapore and India.

From this picture 2 key questions can be discerned. Are there any reasons to assume that FDI in MT will become a major factor in reorganisation of the sector on an international scale? If FDI did assume significance, could developing countries which lack any substantial local capital goods production enter into the production network through becoming sub-contractors of one kind or another? The next section of this chapter tackles these issues.

II.2. Foreign Direct Investment and the Ongoing Reorganisation of Machine Tool Production

Though internationalisation has to date mostly shown itself through the expansion of trade, future patterns of competition could exhibit other forms of cross-border penetration. That the branch will retain its international character seems virtually assured: whatever the trade conflicts or disparities in rates of innovation and diffusion, no country in the next few years will either want or be able to erect and maintain crippling barriers to MT involvement in its market from other countries. The reasons are easy enough to enumerate. First, although industry as a whole has moved far from the metal-mechanical base it had when the original MT branch was the core of industry, the movements in MT itself have been just as fast. Its incorporation of microelectronics, supported by the internal advances in design, have given modern MT such precision and flexibility that they are now a vital element in the new industrial revolution. No country which wants to keep its industrial sector competitive can therefore afford to bypass the use of the most recent vintages of MT even if the country is not producing them. Second, the nature of competition in the sector is such that, notwithstanding the number of differentiated products, prices are kept down quite firmly, thereby limiting investment costs for other branches. Consequently an attempt to cut out cross-country transactions would not only impose costs on the domestic MT sector but also worsen the production costs elsewhere. Third, all big to medium size producing nations have thus far managed to keep a foothold in one or more niches of the foreign markets so that, even where net trade balances are strongly negative, no producing country is trying to eliminate trade altogether. Fourth, corporate strategies are strongly geared to international business since so many customers are themselves firms with international dimensions. To secure purchase orders in one country may well be a step towards obtaining them elsewhere and may imply future international trade, FDI or some form of licensing arrangement.

If the international reach of the MT industry is now firmly established the evidence so far presented in this report points to a highly conflictive process with the relative roles of trade, investment and licencing deals quite unclear. The factors which would encourage production tie-ups of one form or another are these. First, the imposition of trade barriers in one or more markets. Such obstacles could lead to FDI in the countries imposing them, to FDI in other major markets to pre-empt similar moves there, and to FDI in locations which, while not important markets themselves, might offer cost or other advantages rendering them suitable sites from which to export to the original market. Second, the need to remain close to good customers at home who, through FDI, are relocating a large part of their production abroad. Third, the prospect of obtaining easier access to key production components, human or material, whose use could improve real productivity and/or product

quality. Fourth, the opportunity to reinforce control over relevant parts of the international production network, through building up a local presence in those locations. To what extent is each of these factors likely to operate in the current MT struggle?

The push to FDI based on trade barriers has 2 different strands in today's MT market; one relates to firms setting up in the USA and the other to investments in EEC. The obvious country to start looking at for FDI in USA is Japan, given the size of its exports there (almost 45% of all exports, roughly 14% of total output), the VER explicitly negotiated, and the prevailing atmosphere of trade tensions between the two countries. According to a commentary appearing at the same time as the VER was agreed (November 1986) the Japanese "machine tool makers have moved slowly over the past few years to establish some assembly operations overseas. Most are in the US and only produce a small number of units."[2/] That the examples are limited is not surprising if we keep in mind both how new the trade thrust is and how different MT often is as a production and marketing process. Unless producers have solidly founded reasons for anticipating severe trade barriers they are most unlikely to invest in advance of their imposition - and will (in the absence of other driving forces) only invest subsequent to them if the profits are enough and it is not possible to maintain aggregate exports by switching sales to other markets. How whether or not Japanese sellers could have been expected to engage in anticipatory investments is open to question. The precedents of the automotive industry (VER since 1983), steel and semiconductors were, it is true, already there but those branches, especially automotive, were areas where Japan had for some time been the sole target. In MT other countries have also been in the forefront and Japanese producers could be forgiven for caution. But the argument justifying a slower approach acquires greater force in the context of MT production and marketing. In all producing locations (not just Japan) proximity is of vital importance to MT manufacturers - proximity to suppliers of high quality materials and components, proximity to a labour-force to some extent trained by the MT industry itself, and proximity to buyers, many of whose orders are of a 'custom-made' type. These are system requirements, external economies which can be reaped by the firm without it having to pay many (or often any) of the costs of developing them.

As will be seen later, a major barrier to extensive FDI in most developing countries is the absence of these system advantages. Certainly the US possesses the system attributes: but it is not the Japanese system and adaptation to it requires significant shifts from well established modes of behaviour. Japanese MT producers are accustomed to close relations with and support from government (especially MITI) to a tightly knit producers association, to specific links with suppliers and buyers which facilitate economies on inventories, and to labour relations and a type of plant level hierarchy still rare in USA. These difficulties of adaptation are certainly not insurmountable but the conditions for overcoming them probably are along the following lines: being a fairly large firm (about 35 MT companies in Japan employed 300 or more people in 1985),[3/] having a product range with a significant chunk of items that can be sold 'off the shelf', possessing sufficient experience in US deals to know where to buy as well as sell, and being willing to invest heavily in training a labour force that is maybe not only unfamiliar with Japanese methods but also relatively unskilled in the most modern production systems. For a Japanese company possessing those attributes FDI either in a 'greenfield' plant or in a takeover of a US company could both be interesting although a JV, especially of the minority type,

might not be too favourable as it would probably complicate rather than smooth the adaptation process. These arguments add up to a fairly limited field of likely candidates for engaging in FDI and even within them a further push could be decided by the particular way VER is distributed among exporting firms (assuming it is adhered to). In the automotive sector, for example, MITI has regular discussions with the producers and publishes annual lists of the units each company will be permitted to sell in the US market. Although the leading firms have in fact invested in USA, they were undoubtedly helped in at least the details of their decisions by knowledge of the export figures. Most probably the MT situation is a good deal more complicated for the 2 simple reasons of many more firms and many more types of products - and until the real impact of trade restraint is clarified there may continue to be lags in the foreign investment process.

Investment with the EEC, unlike USA, raises issues of past as well as current responses to trade barriers. Enquiries to the relevant MT associations in the EEC, and through CECIMO itself, did not yield any solid data that would permit a mapping of FDI within the community so evidence is necessarily very sketchy regarding the presence of foreign companies.[4/] It seems probable that the leading US firms have been installed in some EEC countries for several years now. Cincinnati Milacron, the top American company, has subsidiaries in FRG, UK and France while Ex-Cell-O, Litton, Textron, Duplomatic, Teledyne Landis and quite possibly several others have plants in UK. Within the EEC, notice again the US focus on the countries already famous for their own MT industries (limited investment in Italy seems to be the exception); Ireland, a country renowned for offering outstanding facilities to foreign investors, has been ignored by MT firms and of the most recent entrants Spain is the only one that might attract firms. Though in most industrial sectors cross-penetration of EEC countries by investment in each other has been a principal feature of corporate strategy to utilise the wider market, the scanty information on MT suggests this has certainly not been the case for the branch. On the contrary, there would appear to have been little FDI worth the name; of the 124 cases of FRG investment examined in Table 19 above not a single one took place in an EEC member (the handful in Spain and Greece date from at least a decade prior to those States joining EEC) while a listing of member firms of MTTA in UK provides only one or two enterprises where investment from elsewhere in the Community seems to have occurred. Earlier tables have shown that intra-EEC trade in MT has been intensive enough and it is quite likely that internal barriers to trade have been low (with a high degree of concordance among industrial standards). Hence the incentives to FDI by firms from member States may not have been sufficient given that other ways of exploiting the market were available.

But what of the current situation and in particular the behaviour of Japanese producers? There is one major investment to go on which, nevertheless, crystallizes the possibilities and conflicts of the present context. Yamazaki, supported by a direct UK government grant of £5.2 mn., has set up a £35 mn. non-unionised factory in Worcester, UK, to produce, at full capacity output (scheduled to be achieved in Spring 1988), 1200 CNC lathes and machining centres per annum. This production is to be reached with a plant workforce of 180 and there are currently 65 Japanese staff, mainly engineers, on site though they are eventually to be reduced to 9. Of major significance are the following aspects of the plant (which began production in early 1987). First, the aggregate production at full capacity would be around one-half of all UK output of CNCMT. The company says that 80% will be exported, chiefly to other EEC members, yet even so claims that its shares of

UK machining centre and lathe markets will be approximately doubled from their present levels of 15 and 10% respectively. These figures suggest major tussles in several EEC countries, not only UK. Second, it appears that some European firms have bitterly opposed this FDI: "West German producers - such as the big lathe maker Gildemeister - which have been in a pitched battle with the Japanese on their home turf, fought tooth and nail to prevent Yamazaki setting up in West Germany".[5] While the balance of interests may favour Japanese FDI in USA the European environment is different and indeed the FRG/UK split may be indicative of an overall contrast of outlook. Whereas FRG remains a top line producer with major technologies of its own and does not want either outward or inward investment (recall the total absence of FRG controlled MT plants elsewhere in EEC) the UK structure is a reflection, on a minor scale, of events in USA. Investments by Japanese companies will be indeed conflictive but are likely to be encouraged by both the government and traditional MT producing regions where imports have already done much damage. Third, as with other products made in the EEC, the thorny problem of local content (LC) exists in this area. Yamazaki claims it will quickly achieve 60% LC defined on a broad basis encompassing wages and factory operating costs, and that is the threshold figure to satisfy EEC rules of origin and therefore qualify for tariff free sales within the region. Intriguingly enough, even as dispute about Yamazaki's extent of LC persists, there is evidence that UK firms themselves may not satisfy the criterion. Thus "many British machine tool manufacturers use a great many Japanese components. A greater proportion than ever build machines from Japanese kits."[6] Even Bridgeport, which has the largest turnover of any UK located maker of machining centres, has its horizontal machines designed by Yoruda and makes them mainly from EEC components while TI recently began assembling Takisowa vertical machining centres.

In sum, the Yamazaki investment is more than a pretty thick end of what could turn out to be a big Japanese FDI wedge, for the controversy surrounding it has brought into the open various of the forces now moulding the shape of things to come in Europe. Thus there are powerful European firms and groups working against as well as for external investment in MT; market shares can be dramatically shifted even by a single investment suggesting that the long lived structure of many small and medium size firms could be giving way to much more concentration, and that transformation could be fast; and FDI is clearly not the only route which is being used for Japanese market penetration - the assembly system for high value advanced technology items has already taken root. Product heterogeneity in MT cautions against uncritical extrapolation of these findings to the whole sector but enough evidence exists to hazard the guess that the EEC may be changing even faster than USA.

Since MT is a capital goods sector, whose demand emanates from a quite small set of major industries (primarily automotive, aircraft and military related production) that are dominated by a relatively limited number of large firms in each of the main OECD countries, the extent and location of MT output is strongly influenced by shifts in the what and where of production by those firms. Over the years the crucial industry in this respect has been automotive: US firms have engaged in substantial output abroad for a long time and VW has been active since several years. But it is the Japanese automotive industry's international spread during the present decade which generates the most interest regarding MT investment. Toyota, Honda, Nissan and Mazda have all set up, jointly with US car producers or on their own, large plants in USA, they all have big facilities producing key components in Mexico as a result of FDI in the present decade, and some of them plus

Mitsubishi and, to a lesser extent, Suzuki and Isuzu, have made appreciable investments in UK (within the EEC), Taiwan, Province of China and Republic of Korea (within the Far East) and Malaysia, Philippines and Thailand (within Asean). All these investments set up large initial (at factory establishment) demand for MT plus a lower continuous demand to support ongoing production (this latter type is not to be equated with the demand for automotive components, which is much bigger in terms of volume though not necessarily value). The circumstantial evidence strongly suggests that the Japanese auto producers have sourced the overwhelming majority of their MT purchases (probably, in fact, all MT for most of the FDI) from Japanese firms (this holds true even for the principal JV i.e. the Toyota/GM plant at Fremont, California). To date it appears that the MT companies have met the orders through export but this pattern may be subject to change - what factors are at work?

On the plausible supposition that the major wave of automotive FDI from Japan has already spent itself it might be thought that MT producers no longer have (at least from this perspective) any incentive to invest abroad; that conclusion, however, would be too hasty. First, the demonstration effect of these plants working almost entirely on the basis of Japanese MT is certainly the best advertisement for these products in the US market and should lead (other things being equal) to enhanced demand from US producers in automotive and other heavy capital investment industries. Now that demand is better satisfied from local manufacture rather than export from Japan because the Japanese producer is involved not only in manufacture but also design work and problem solving jointly with the US company purchasing the MT. For this kind of market, there are appreciable advantages to be gained from producing within it.[7] To put the point a little differently: exploitation of the market edge obtained by showing yourself to be a first-class provider of numerous more or less custom-made items fitting together into a coherent advanced production system means making yourself available permanently, on the spot, to other clients of the same kind. This was not such an imperative with the original Japanese auto investors because they and the MT producers had already been working together for a long time in the Japanese context. Second, the Japanese MT producer stands to benefit, in its own right, from a production presence in a major location because that widens the range of tasks to be confronted and therefore capabilities to be developed. If MT competition on the international scale has hitherto been conducted chiefly through trade, that framework is altering. To remain on the frontier is not only, not even primarily, a question of paring down costs and prices for standard products - it is still more a matter of exhibiting a wide range of design and problem solving abilities tailor-made to meet specific demands in all key markets. FDI is required to do this. Third, the prospects for profitable JV arrangements in various international locations between MT producers and their clients seem to be on the increase, again due to shifting demand patterns. Once more the demonstration of detailed knowledge of and experience in each environment, assets acquired from producing and not just selling, is a critical element towards becoming a good partner in such deals. Fourth, the maintenance of sales over time, as opposed to 'one-off' orders, may be affected by LC requirements. Just as Toyota, for example, has to show it is a US producer, so Toshiba Machine may have to demonstrate growing degrees of LC. This means, of course, not only local production but also local provision of the materials for that production. If large firms have usually been able to keep down the pressures for rising LC in fairly small and less industrialised countries, the likelihood of so doing in major countries of the OECD is not so great.

The third possible reason for FDI given earlier in this section refers to the prospects of increasing productivity through obtaining access to cheaper and/or better human and material resources for production through relocation. For MT it is unequivocally the leading OECD countries plus a few developing countries in Asia viz. Republic of Korea, Taiwan, Province of China, Singapore and India, along with Brazil, which offer the system supports for effective MT production capable of meeting international and local demand. Other nations may provide cheap labour but the value of this asset depends on how much the production process can be broken down into labour-intensive segments, on the importance of labour cost in total changes, and the significance of transport costs between locations involved in the production network. What can be said on these issues in relation to MT?

A distinction has to be drawn between NC and non NC MT, for the simple reason that the former incorporate a substantial electrical/electronic component while the latter do not. This means, in turn, that NCMT firms may have to buy in a big part of their production inputs, even more so if the NC items are made with special quality steels and/or other relatively new materials. As the Chairman of Acme-Cleveland, an important MT manufacturer in USA, has succinctly put it: "Industries are moving away from the idea of taking big chunks of steel and machining away the scrap."[8/] To the extent that cheap labour supplying developing countries become effective sub-contractors in electronics and the units made go into MT produced in OECD locations then the indirect labour content from developing countries may be appreciable - yet that still does not answer the direct labour issue. Two possible activities in developing countries would seem to be metalworking and machining as such, and assembly. In the former activity it would be a case of finding a sufficiently experienced work-force to undertake the tasks allocated. Since the cheap labour countries under consideration here by definition exclude places where a reasonably extensive, sophisticated and long established MT branch exists, there is a conflict between the monetary cost of the labour and its suitability. A training period would be necessary with the benefits accruing subsequently in terms of enhanced real productivity. The absence of detailed breakdowns of the metalworking/machining steps needed for the manufacture of standard MT, the relative unit costs of carrying out these steps by human input as against machines, and the differences in real labour costs (assuming people rather than machines were carrying out the steps) between, say, Japan and Sri Lanka, militate against giving any hard and fast assessment of the prospects for this type of FDI. Fairly informed guesswork, nevertheless, can offer some useful pointers. To justify the investment a foreign firm would need to be producing a fairly large batch of an item (probably of a standard kind) for sale either in its home base or in a third market since production mainly oriented towards sale in the country carrying out the contracted tasks is most unlikely to find sufficient outlets. This does mean, however, that quality standards will be high relative to those in the developing country; hand setting and hand guaging of tools, for example, will probably be inadequate. The inexorable tendency is to shift semi-skilled operating tasks of that nature onto machines and thus reduce the need for human labour. So the scope is probably restricted and becoming narrower at a rapid rate; for any one country to succeed in enticing and keeping FDI of this type is a daunting task in the present context.

At first blush assembly activity may seem more promising, especially since assembly work is precisely what has been the focus of so much FDI to cheap labour countries in the past two decades. Automotives, garments and electronics have all been prime targets; but does assembly in MT have the

same meaning and relevance as in these other branches? Basically assembly labour is of two sorts - putting together whole kits (the automotive case) and putting together subcomponents at the same time as carrying out several of the specific production operations on the way (a process reaching its fullest expression in garment manufacture where the foreign firm supplies the cloth, the designs and then undertakes marketing). Common to the two sorts is the emphasis on large-scale manufacture directed almost exclusively (save for some automotives) to export markets. MT appears to stand in an intermediate position. Recent commentary on the UK industry emphasises the relevance of assembly: "One of the ironies of the complaints about Yamazaki's 60% local content is that many British machine tool manufacturers use a great many Japanese components. A greater proportion than ever build machines from Japanese kits."[9/] Yet this assembly is handled by relatively skilled and experienced workers and the products are frequently (probably in most instances) directed at the UK market itself i.e. the purpose of the importing enterprise has nothing to do with earning foreign exchange (on the contrary it is a net user) and everything to do with hanging onto a place among domestic suppliers. Moreover, assembly in MT cannot be a big volume activity: all the figures quoted in this report for units of output are way below those normally cited in other industrial branches. There may, of course, be many assembly steps yet both these and parts handling in general are to an even greater degree taken over by such advanced equipment as automated guided vehicles (AGV) and computer operated stacker cranes. So in this dimension, too, there are few grounds for optimism about attracting FDI from OECD to cheap labour sites.

Observations on the chape labour argument for FDI would be incomplete if they failed to stress again the extent to which the more advanced countries and enterprises are shifting away from labour and, where they do use it, towards a different type of labour. The massive shakedown in USA since 1981 has witnessed the demise of 300 out of 800 MT companies and an overall employment reduction from 100,000 in 1981 to 70,000 in 1986: even Cincinnati Milacron, one of the foremost companies with strong international links, cut its workforce from 14,000 to 9,000 in the 1980-1986 period. On labour quality and corporate strategy the approach of Deckel, the major FRG producer of universal milling and boring machines, is most instructive. The company employs some 2,300 people - and investment in them has been a critical part of its overall investment during the past 5 years. Given the sharp move to NC products, in-house training has become the cornerstone of personnel development. "About 30% of its apprentices (120) go through a double or triple programme, which adds electrical and electronics skills to mechanical training. For those doing all three, the learning time is doubled to at least six years, with wages, instruction and equipment costing Deckel some DM200,000 per person."[10/] As the company Chairman emphasises: "You can't go out in the open market and find these people. Its clear we had to make this commitment."[11/] All in all. the chances are not great that MT producers of any weight will look for cheap labour oriented FDI locations - they are investing more in homebase staff, not trying to cut costs by going abroad.

The final reason for FDI stated earlier was reinforcement of control over the international production network. In essence this means locating manufacturing plants and key managerial staff in coutries possessing one or more of the following: big markets, natural resources required for the manufacturing process, highly innovative enterprises within or without the MT branch from whom the investing firm can learn. Undoubtedly this pull to FDI partly overlaps with others, especially the tariff barriers argument and the

linkage with big firms at home in related industries. Undoubtedly also the key countries named more than once in this report and around whom the world MT market rotates these days are also the only locations which would be seriously examined for this kind of strategic investment. No developing country outside of that small set of countries will be considered. If the chances of attracting FDI for the preceding three reasons are slim, the prospects for this last reason are virtually nil.

The emphasis throughout this section of the chapter has been on investment by major firms and countries. A fully rounded picture compels some reference to three other issues viz. the possibility of FDI by some Asian NICs, the nature of cooperation arrangements and the role of incentives and competition among different countries in attracting FDI. These points are briefly dealt with in the following sub-sections.

II.3. The International Horizons of Newcomers

After the uncritical 1970s inclusion of a few of the large to medium size Latin American countries in the category of NICs, the focus seems to have returned to the four Asian countries 'founder members' of the group, i.e. Republic of Korea, Taiwan, Province of China, Singapore and Hong Kong. Of these the last will formally revert to becoming part of China in a decade's time and is of less interest for purposes of this report. But the other three have all shown definite emphasis on strengthening their domestic capital goods capability (less so Singapore, a much smaller country physically and population wise than the other two) and systematically incorporating ever more advanced technology, as well as extending the international reach of their firms through FDI. Consequently the three countries, and above all Republic of Korea and Taiwan, Province of China, have progressively devoted more attention to MT production and its very international dimensions. How should the global picture be modified to take account of their presence?

Tables 20, 21 and 22 set out what is known about FDI behaviour of Republic of Korea, Taiwan, Province of China and Singapore respectively. For the first two countries there are estimates (at then prevailing exchange rates) of the US$ value of the stock of FDI partially disaggregated by recipient area and sector, while in the case of Singapore Table 22 classifies the ownership pattern of investments (almost entirely in Asia) and the footnote gives some of the figures for value of investments in other Asean nations. These tables permit the following comments. To begin with, the stocks are certainly tiny compared with those held by the leading OECD members. The fairest yardstick is Japan, being an Asian country, the closest to the NICs in terms of income per head and the latest starter in foreign investment. A summation of investment stock for the three countries as of mid-decade yields a figure of the order of $2.5-3.0 bn., or not much above 3% of the Japanese total. As for Japan the priority areas of destination are USA and Asia, while fragments of information confirm that Korean and Taiwanese investments in USA, like those made there by Japan, are mostly of post 1980 establishment. On a sectoral breakdown there are divergences, especially between Republic of Korea and Taiwan, Province of China. The former has the Japanese sectoral profile though to a still more pronounced degree: the search has been for natural resource investments (mining plus forestry approaching 55% of the total) with only one-sixth directed to manufacturing. The Taiwanese case is totally different showing by far the greatest orientation to manufacturing of all countries for which FDI data exist - almost 90% of the total. Within manufacturing a very crude approximation to

the importance of engineering goods is given by adding the last 2 columns of Table 21 (basic metals and machinery and equipment) and comparing them with the manufacturing aggregate. The combined total of $7.7 mn. is some 4% of all manufacturing; within this, basic metals accounts for the large majority and nearly half the basic metals total represents FDI in Malaysia. In the machinery branch almost all the investment is in USA, suggesting once more the concentration on that country in trade and investment. Only the Singapore data (Table 22) provide information regarding ownership patterns and they reveal a very marked preference for JV arrangements: of the cases examined only 16% were wholly owned subsidiaries while minority JVs were virtually two-thirds of the total. The bits and pieces of available information relating to the other countries tend to corroborate this finding: FDI from the NICs normally is channelled into JV arrangements and these are usually of the minority type. There is inadequate data to determine whether the deviations from the overall contours are pronounced for individual branches but there is at least no solid evidence against setting up JVs in the engineering branches including MT.

What, then, is the state of MT production in these countries and what might they wish to accomplish abroad? In the Republic of Korea 1986 production of $350 mn. (c/f Table 2) stemmed officially from 110 registered firms. Many of these, however, are very small and a large share of the total comes from only a few companies of which Daewoo Heavy Industries, Tongil and Swachon are the most significant. Their current technological level is, in global terms, only moderate but they are extending continually into more advanced items, using a mix of foreign technology and locally developed know-how. Thus Daewoo incorporates Fanuc controllers in its products while trying to design and produce its own (a process the company estimates may require another 3 to 5 years). By drawing on key foreign components and designs (both obtained mainly from Japan) some quite advanced manufacture takes place but there is clear recognition by the government that more LC is necessary; this must come on the material side as well as from design. Till now Korean firms have been notably less successful in MT exports than in most other industrial branches, a striking indicator of 'relative failure' being the fact that it has not been necessary to negotiate a VER for the US market. Government indicative targets for 1987 include a doubling of exports (as compared with 1986) to $55 mn. and an expansion of domestic output to $450 mn. The fragmentary data on the markets which are earmarked to receive these exports suggest that Korean output may be switched quickly towards Europe (currently over half the total goes to USA) where it is obviously felt they may have more scope. A summary assessment of the trade situation just published concludes: "Korean machine tools have so far presented little threat to indigenous European producers. However in open markets with a relatively weak domestic industry, like that of the UK, low-cost Korean as well as Taiwanese products have tended to disturb prices at the bottom end of the market."12/

The picture for Taiwan, Province of China varies from that for Republic of Korea in that the former seems to be technically more advanced, with greater exports (and a proportionately large trade surplus in MT) encompassing a higher quality product mix. Though the data of Tables 20 and 21 do not permit specific statements on FDI in MT to be made, it seems a fair assessment to say that whatever investment abroad has occurred has probably come from Taiwan, Province of China. The preferred destination has been USA as Taiwanese producers have sought to improve both knowledge about and trade relations with USA; could, however, Taiwanese and Korean firms look for

production bases say elsewhere in Asia? Keeping in mind the discussion about reasons for FDI presented in the previous sub-section there is one important difference when comparing the NICs with their Asian neighbours - at prevailing exchange rates the wage differentials are small. Thus while wages in Republic of Korea might be around double those in several other Asian countries, this gap is not of too much significance when measuring any of these nations against say Japan. It follows that, unless there were trade barrier reasons to relocate production e.g. quota circumvention, the cost advantages would surely not warrant any FDI. In the near future i.e the next year or so, the only reasons for altering that conclusion would therefore be a change in trade barriers or a realignment of exchange rates. The latter does indeed seem quite likely: USA has been exerting considerable pressure on both Taiwan, Province of China and Republic of Korea to devalue their currencies against the $ by a sizeable margin.[13/] The pressure is due to the trade surpluses both countries have with USA and the constant efforts by that country to be seen as an industrial workshop rather than an industrial fair where everything can be bought. A shift in the cross rates just referred to would mean, other things being equal, devaluation of other Asian currencies against those of Taiwan, Province of China and Republic of Korea. Consequently the other countries would become more interesting as production locations though the exchange rate shift might not in itself be decisive (c/f the Japanese automotive experience where for some time the exporting companies did not modify $ prices in USA but instead accepted lower unit profits themselves; the switch of behaviour occurred as the appreciation of the Yen became too great and the VER regime came in). On balance, however, it is not at all likely that currency changes will be enough to encourage FDI on any scale from the Asian NICs - from this direction also there is unlikely to be much impetus to MT output elsewhere in the region.

II.4. The Nature of Cooperation Arrangements in Asia

The references to the experience of Asian NICs in terms of their MT production and FDI have explicitly signalled their use of foreign expertise though this has rarely been through FDI. Despite the paucity of data, then, there does seem to be a good deal of foreign collaboration of one kind or another taking place in the industry. To provide a view of what is going on Table 23 summarises, on the basis of news items appearing in trade journals, some instances of collaboration arrangements involving Asian countries in the period 1984-1986. The countries selected are the two main ones of the preceding sub-section plus the three largest nations; the choice was dictated by the fact that the five countries listed embrace a wide range of technological situations, all either have or explicitly plan to have quite big MT industries by the early part of the next decade, and by the pragmatic yet nonetheless illuminating consideration that industry sources rarely mention any other Asian countries.

Perhaps it is not a surprise that, of the 15 cases listed, US partners predominate; 4 cases involve Cincinnati Milacron and 3 Cross and Trecker, along with further examples bringing in Flow Systems, Auto Numericals and Ex-Cell-O. The material presented earlier in this chapter pointed towards a greater degree of internationalisation (in the sense of deals abroad other than exports) by US firms than those of other countries - what Table 23 does is to give some substance to the notion. Licensing arrangements occur frequently, especially when Cincinnati Milacron is the American producer, while Cross and Trecker seems ready to enter JV deals (and in 3 different countries). The products subject of these arrangements are heterogeneous yet

with surprisingly few of NC/CNC variety (in fact all contracts in Republic of Korea focus on NC/CNC lathes and the only other CNC arrangements have been concluded in China by Trumpf of FRG and in India by Beaver of UK). There is clearly a strong drive by various OECD firms to collect returns quickly on their technological assets, probably menaced by the prospect of rapid obsolescence and encouraged by the prospect of selling equipment and components without committing cash of their own. Indeed the current picture is in several respects a classic one. Companies located in the OECD markets most severely strained by imports and actual cum impending FDI are finding not only their market shares falling at home but their exports too subject to a severe battering: with falling sales, especially in an industry where job orders are not easy to organise, a liquidity problem is bound to arise for firms. Funds for FDI are thus not easy to find, while the competitive strains increase the temptation to increase cash flow through 'renting' intangible assets. Although Table 23 is only illustrative and makes no pretence whatsoever at a comprehensive picture the evidence is fully consistent with the classical pattern: licensing by US and UK firms, not one case of licensing by a Japanese company, and a heavy concentration of product sales from these arrangements in the home markets of the Asian countries.

The table has some other, less obvious, features that merit a comment. A Chinese firm (Peking No. 1 Machine Tool Plant) and a Korean one (Tongil) have invested themselves via takeovers of an American and a German firm respectively. Both investments involved less than full ownership, as the Chinese company shared its purchase with Susanto group of Hong Kong and Tongil acquired majority ownership. In each case the aim seems to have been rapid and full access to NC and CNC technologies and products. This 'reverse FDI' may well be a coming trend as the heavily committed but less advanced Asian countries seek to widen their technical command and product range. It is sometimes easier to do this by investing yourself rather than being invested in or paying for use of a technology that is never owned and may become obsolete quite fast. Obviously investment of this kind is best done through a takeover rather than a 'greenfield' operation and, given limitations on financial resources, will usually be directed at no more than medium size businesses in the OECD countries. Hence there is a clear contrast between Japanese and other Asian FDI in the OECD - the former aims mostly at using its own technology, can often be 'greenfield' and on a big scale, and extends an international network, while the latter is trying to have access to other people's technological assets, will be of the takeover type and that on medium scale, and is probably as much concerned with raising quality for home and external markets as with any kind of international network. Tongil, for instance, is known to be keen on expanding European sales of machining centres (target exports of about $13 mn. for 1988 in Europe) and no doubt sees the acquisition of Heiligenstaedt as a prime route to achieve the target.

There appears to be one case of a turnkey operation and, intriguingly enough, the seller is a company based in Taiwan, Province of China (though it may be the Taiwanese affiliate of a US firm). In general MT is not a branch where turnkey operations would be expected to be frequent: whereas in (to take the turnkey sector par excellence) chemical engineering so much of the final product performance is dependent on plant design, in MT the product design has hitherto been overwhelmingly the key factor with much output taking place in simple workshops or larger but still quite crude factories. Admittedly the relationship between plant design and sophistication of the product may be altering with quantum leaps in the latter compelling huge advances in the former. Nowhere is this better evidenced than in the Yamazaki

plant in Worcester, UK (mentioned earlier in this report) where the production technology updates that used in the company's home Minimoto plant and in its 1982 established facility in Kentucky, USA. The plant area covers 16,500 square metres and, to meet the complexity of the CNC lathes and machining centres produced there, includes features such as: isolation of the floor in the superfinishing section to minimise vibration; a fully automated underfloor pipe system to handle the coolant supply for the production machines; an overhead monorail to transport replacement tools; a buffer store in the central aisle of the plant; and of course a precision machining area which is entirely computer controlled. Layout in such a plant is clearly of the utmost importance yet even so there is a heavy demand for internal transportation which includes 5 AGVs and 14 computer controlled stacker cranes. Such a plant necessitates intense involvement of the MT producer in its design and perhaps even in actual construction and it could be that a business will begin to grow in the plant design and erection area. The Leadwell operation in Indonesia may thus be the forerunner of a series of activities in those Asian countries where there are extensive plans for raising MT output qualitatively as well as quantitatively and countries wish to maintain substantial national ownership of the facilities.

Product marketing is firmly oriented towards the producer countries themselves but there are some instances where sales may be extended to elsewhere in Asia and a couple of cases where US itself is also targetted. The mix fits well with current conditions and most forecasts for the next few years: the biggest Asian countries aim to expand MT output to meet growing domestic demand, industrialisation is expected to continue extending itself, and there will be a constant effort to combine import substitution with export growth. Collaboration arrangements will reflect these objectives - while smaller Asian nations, and particularly those where the absolute size of the industrial sector is tiny by international standards, may try to obtain a marginal linkage with some MT suppliers, the bigger States will go for accords that maintain a degree of independence for themselves and where they can constantly dangle access to their markets as a bait to foreign producers.

Finally, Table 23 has the germ of one longer term collaboration of an international nature viz. the link between Hyundai Motor and Cincinnati Milacron. The Korean firm (already 15% owned by Mitsubishi) is the major automotive producer in the country, manufacturing 420,000 cars in 1986, with mid 1987 capacity of 600,000 and a scheduled end 1987 capacity of 750,000. But the North American axis of its operations is vital: in 1986 exactly 40% of output was sold in USA and the target range for this year is an increase somewhere between one-fifth and one-half total US sales. This leap into USA has inevitably raised questions of possible VER imposition and therefore FDI in North America by Hyundai: "The company is building a 100,000 a year car plant in Canada, due to come on stream in 1988 and has said that it will decide within the next year or two whether to set up in the US."[14/] In that context a close link with one of the world's specialist MT producers, based in USA, is entirely understandable and mutually beneficial. Cross fertilisation of markets and products can take place with Hyundai strongly dependent on activities in North America and Cincinnati Milacron undoubtedly interested in securing as 'captive customer' one of the major industrial firms in one of the most important and fastest growing Asian countries. Further ventures of this kind might well be a feature of future developments in MT.

II.5. The Significance of Investment Incentives

This chapter has concentrated entirely on the forces at work, macroeconomically in the OECD countries and in the MT branch itself, which influence foreign investment decisions. Before going in the next chapter to an explicit discussion of what measures Sri Lanka might take to encourage FDI, a brief comment on the role of investment incentives within the current context is necessary - what value if any are institutional, legislative and financial actions within prospective recipient countries?

The current international economic environment is characterised by the following features in relation to investment. First, the annual rate of FDI is falling from all major OECD nations except Japan where, on the contrary, the recent period is the boom time. Second, USA now accounts for around 30% of the world's FDI, well down from the 46% at the start of the 1970s. Third, that same country is now the major recipient of FDI with a share probably approaching one-third of the total; in the year 1 April 1985 to 31 March 1986 about 45% of Japan's FDI was directed to USA while in the calendar year 1986 some 30% of the FRG aggregate went to the same country. In 1985, of the 912 cases of major inward investments as classified by the Commerce Department approximately 24% were Japanese. Fourth, the economic crisis which continues to assail much of the Third World has led to a fair degree of disinvestment there, though admittedly Asia has been the region least affected by this trend. Even where disinvestment has not occurred the accent is firmly on conserving the parent company's finances; in Latin America, for example, around two-thirds of FDI from US companies stems from reinvestment of profits by subsidiaries already established there and risk capital represents only a quarter of the funds obtained by affiliates, and this while there has been but a slight drop in profit remittances in the very period when production by affiliates has fallen considerably. Fifth, a major thrust, backed not only by the international finance houses but also by the World Bank as part of its policy advice, is on to dynamise credit markets in developing Asia. The idea is to mobilise local risk capital and access to it will be available to companies setting up in those countries - here too the results will be to reduce the proportion of foreign sourced capital in an FDI transaction.

It is in this setting that developing countries are trying to encourage FDI - they are clearly confronted with an uphill task. So stress is often placed on setting up a battery of incentives; their effectiveness, however, is limited and that for simple enough reasons. All countries in the business tend to institutionalise more or less similar packages which put them, as it were, in the same starting blocks but without giving any one a particular advantage. As an example Table 24 brings together, under 5 sections, 26 conditions which investors usually consider favourable and looks at their occurrence in the 5 main Asean countries. In 10 instances all countries have the same situation and in 4 others there is only one country differing from the rest. On what are regularly cited by OECD firms (and their governments) as 'sensitive' issues the table is eloquent: on guarantees against expropriation and nationalisation, and for repatriation of earnings and capital; patent protection, employment of foreign staff, and protection of competition against imports (the Singapore divergence here counts little given its special trading position); exemptions from tariff on imported capital goods and raw materials; corporate tax deductions for reinvestment of profits; and special incentives to exporters, on all these there is unanimity. The essential ingredients of the incentives code are present throughout the sub-region, only the decorations vary among the cooks. In

effect the institutionalisation of all these incentives does little else than put a country's name on the list as a possible candidate for receiving FDI - it does not give the country any special position. The more countries as a group try to compete against each other the worse off they are each likely to be i.e. they will be playing a negative sum game in which each one comes out a loser. One analysis of the Latin American situation has concluded: "Questionnaire surveys among transnational firms show that the incentives to foreign investment have, with the exception of protection against competing imports, little or no influence on investment decisions, particularly as regards production for the domestic market. In any case the effects of incentives specific to foreign investment are uncertain and lose their effectiveness the more complex they become and the more often they are modified."15/

The preceding remarks thus show that incentives certainly do not, of themselves, persuade firms to make investments which they would not do otherwise and they also are most unlikely to have much influence on location since in todays world (at least in Asia) there is considerable harmonisation (conscious or otherwise) of legislation. Decision making is made in response to the fundamental macroeconomic conditions and the evolving patterns of international industrial structure - what is done legislatively and institutionally by individual countries hoping to attract FDI is of little sway.

II.6. Summary

This chapter has shown that MT has not been an industrial branch notable for FDI, whether measured in relation to other branches or its own production. There are, however, distinct signs that a major change may be taking place. At the moment the critical movements centre on the leading OECD countries with the weaker producers, USA and UK, the targets for Japanese FDI. Part of the investment in USA is the beginning of a reaction to a VER regime and another part is tied to linkage investments with the Japanese automotive firms that have set up production in USA in the 1980s. Foreign investment in UK is making use of that country's membership of EEC to employ the country as a platform for exports to elsewhere in the region. In both recipient countries the long tradition of MT production as well as the existing infrastructure have been important pull factors for investment, along with the local and regional markets. Prospects for FDI in developing countries are not great save for the handful of nations which are large industrial producers and/or already relatively advanced in MT. Cheap labour to undertake assembly activities is not a prime consideration for firms: current trends point to a marked shift away from labour intensive production and a sharp upgrading of skills for those remaining in MT employment. For the present those NICs investing abroad also focus on USA and are unlikely to look at other locations for quite some time. Examination of some cases of recent collaborations in the main Asian developing countries shows a prevalence of licensing deals, especially from firms in USA, an absence of Japanese operations, an emphasis on production for local markets with some export to the region, and the beginning of FDI in OECD locations. Finally, there is no evidence to suggest investment incentives have any positive impact on a country's chances of attracting investment - at best they put the country on an enterprise's list of possible sites.

1/ See Süddeutsche Zeitung, "Deutsche Investoren meiden die Entwicklungsländer", 9 April 1987.

2/ Far Eastern Economic Review, loc. cit., footnote 4/ of Chapter I above.

3/ The top 10 firms in both Japan and USA account for 50% of output in each country, while in FRG the same number of firms produce 26% of the output.

4/ In response to enquiries made directly to national associations regarding the incidence of FDI here are some of the responses (quotations from the correspondence). CECIMO: "Our Committee does not possess information regarding investment by machine tool builders of member countries of CECIMO, whether referring to investments in their European headquarters or investments abroad. But it is possible that some information may be available with member associations of CECIMO..." (translated from French text). MITTA of UK noted: "You will appreciate that a number of machine tool companies have developed close distributor relations with countries and companies in South East Asia but the only direct investment of which we are aware has been made by Bridgeport Machines Ltd. This company has established a successful manufacturing plant in Singapore." SYMAP of France stated that information could not be provided due to its confidential nature. NMTBA of USA wrote: "Unfortunately, no such information exists. We cannot track such practices because US machine tool builders are generally privately held firms who do not report such activity to any central authority. We are aware of a few firms with foreign joint ventures etc. but do not have a complete listing." The Korean Institute for Economics and Technology indicated: "No Korean firm is found who has an experience of foreign investment to other Asian countries in this industry. One Korean firm, Doo-Son Machinery Co. Ltd., exported a production technology for radial drilling machines to India early in this year (1987). Doo-Son has developed its own model for a radial drilling machine and exported them to South-east Asian countries since 1982. Royalty for the technology transfer was 3.1% of total net sales for 5 years." The National Council of Applied Economic Research in India noted that interviews with Indian MT firms would be necessary to obtain information regarding FDI; some material may be provided through the ongoing study of technological development in the CNC MT industry in India.

5/ Financial Times, loc. cit., in footnote 5/ of chapter I.

6/ idem.

7/ The point has been put succinctly by the Vice-President for Corporate Planning of Honda, USA. Noting that when production began in 1982 the decision "obviously didn't make economic sense" she stressed that it did "make philosophical sense" and stated "When you begin to market products in a country and enjoy success you should think about manufacturing there as soon as possible. We don't spend much time in this company discussing the bottom line: the profits will come in the end if you satisfy customers." Financial Times, "Beware the Simple Solution," 18 May 1987, p.16.

8/ idem.

9/ Financial Times, op. cit, footnote 5/ of chapter I.

10/ Financial Times, "Deckel specialises as it fights back," 10 April 1987, p.20.

11/ idem.

12/ Financial Times, op. cit., footnote 5/ of chapter I.

13/ Taiwan Province of China has huge foreign exchange reserves, currently estimated in excess of $50 bn.

14/ Financial Times, "Confident Industry aims for middle size Slot", 14 May 1987, p.VII.

15/ Eduardo White, "Las Inversiones Extranjeras y la Crisis Económica en América Latina," Comercio Exterior, October 1986, p.862.

Chapter III: The Prospects for Sri Lanka

III.1. Sri Lanka in the Asian Context

The report has underlined the gravitation of the world's industrial economy towards Asia and the particular weight which primarily Japan, and to a lesser degree Republic of Korea and Taiwan, Province of China, have rapidly gained in the MT market. In this maelstrom the smaller Asian countries outside of the Pacific, of which Sri Lanka is the principal case, are in serious danger of marginalisation. Indeed it might be argued that Sri Lanka could come to be regarded as an economy possessing more the development problems characteristic of Africa rather than Asia i.e. export earnings heavily dependent on less than a handful of primary commodities whose prices completely fail to keep pace with those of the standard bundle of imports (a secular deterioration in the terms of trade), significant distance from major consumption areas in the world economy, an industrial sector small in relative and absolute terms suffering severe structural weaknesses and with highly circumscribed room for manoeuvre, and chronic international and public indebtedness rendering the country ever more vulnerable to conditions on macroeconomic (and thus sectoral) policy imposed by the international lending agencies.

That view would, in present circumstances, be too gloomy in several respects. Sri Lanka's contemporary history is notable for the largely successful attempt to create the core elements of a social welfare system in a poor country. It is that approach which has given the high levels of literacy of the population, the levels of nutrition and provision of basic health services which distinguish Sri Lanka from many other parts of the Third World, and the emphasis on public works. Through its geographical location the country is still involved with Pacific Basin nations to a much greater extent than any of the sub-Saharan African countries. And Sri Lanka has, for the past decade, followed a policy of encouraging FDI in manufacturing with a pronounced bias towards export; in so doing it moved before most of the African countries but later than the Asian NICs (though there only the city States of Hong Kong and Singapore placed extensive reliance on collaboration arrangements for their exports). Unlike the sub-Saharan African countries, however, Sri Lanka stands isolated in terms of relations with some of the major economic groupings. Although the country is party to the Lomé Convention and a member of the Commonwealth, these are arrangements which yield relatively little trade and aid benefits. The country is apart from any strength through numbers which could be derived from participation in regional groupings, however loose (SADCC now handling that task for 9 states in sub-Saharan Africa and Asean for 6 states of Sri Lanka's own region), is outside of these groups which receive special attention from international lending agencies, and does not fall within the 'preferred area' of any of the major donor countries. Sri Lanka is thus to an important extent on the fringe of the map for many aspects of decision making: whatever is accomplished will be through its own efforts and not with the force of other countries to buttress its actions.

To provide a general frame of reference, Table 25 summarises some macroeconomic indicators for the 3 largest Asean members, China, India and Sri Lanka. On a per capita income basis Sri Lanka is at about half the level of Thailand and some 25% below Indonesia; although reliable comparisons are not easy to establish, the distribution of income is probably much more equal in Sri Lanka than in the Asean states. The column for industry's share throws

into sharp relief Sri Lanka's limits as a market; on a par with India in relative terms but a few percentage points below the rest means that the absolute size of industry is well below that in any of the other Asian states listed. Unlike say Hong Kong and Singapore, tiny countries but with heavy concentration on industry and intricate networks of financial and communications services as backup, or Malaysia, a country of comparable size of population yet (notwithstanding the depressed prices of its main commodity exports of petroleum, rubber and tin) with the potential to develop considerable industry based on natural resource and agricultural commodity processing, Sri Lanka's industry has few systemic or natural advantages to build on. There is, in short, a fundamental problem of integrating industrial activities with the rest of the economy. During the past decade the thrust of policy has not been towards building linkages among branches or across sectors but rather to encouraging a type of industry which could at least bolster employment and the foreign exchange position. The final column of Table 25 expresses the percentage variation in gross export receipts over the quinquennium to end 1985 and shows the increase for Sri Lanka to have been second only to China. Given the relative stagnation of earnings from traditional commodity exports, much of the rise is due to manufacturing trade and the government continues to look for ways to augment and diversify that commerce - hence the interest in MT (among other branches).

While Table 25 illustrates how Sri Lanka compares to some other Asian nations macroeconomically, to locate it in the Asian context requires some further exploration of the investment situation. It is simplest to begin with Japanese investment since this is the country located in the region, the world MT leader and now showing the highest marginal propensity for FDI. Table 26 describes the country composition of its investments in Asia during fiscal year 1985 (i.e. to 31 March 1986). Ten countries are listed explicitly and to them more than 98% of all FDI to the region is committed; Sri Lanka is not mentioned and its part of the category 'other' could only have been minute since the whole of the Indian subcontinent plus various other countries also figure in that group. Moreover, the general figures here do not tell the whole story. Some of the stronger commentaries argue that Asia has been left aside by the boom in FDI from Japan. Thus one recent assessment commented that "except for significant increases in investment in Singapore, South Korea, Taiwan and to a lesser extent India, the Japanese are leaving Asia high and dry"[1/] and "As Japan moves into the information revolution, it has also lessened the need for South East Asia's raw materials its survival once depended upon."[2/] The figures for the past couple of years vary sharply from the pattern of the late 1970s and early 1980s, especially for the Asean countries which are probably Sri Lanka's most serious competitors. From 1977-1983 the annual average growth rate of Japanese FDI in manufacturing was 18.7% globally but a superior 20.6% in Asean (corresponding world and Asean statistics for 1976-1983 were for USA 6.6% and 13.3%, for FRG 12.2% and 12.8%). So Sri Lanka is barely on the map even where its neighbours (economically speaking) are somewhat losing their place.

A more detailed picture in relation to FDI can be gleaned from some other recent research. Looking once more at the Asean countries (less Singapore and Brusei) Japanese FDI is far more concentrated on manufacturing than is investment from USA: 1983 data show the share of manufacturing in the US total to range from around 4.5% for Indonesia and Thailand to some 35% for Philippines, whereas the corresponding span for Japan runs from 27.5% in Indonesia to 75% for Thailand. Within manufacturing Japan put close to one-third of the total into metals and metal products against just one-seventh

for USA. On areas of interest to Sri Lanka, therefore, Japanese behaviour is of considerable significance. A failure to make an impression on Japan would thus mean that investment in the MT and metalworking areas would have to be sought in bits and pieces from firms located in countries that are either not at the core of the branch or are losing their position in the core group. Since, moreover, the labour intensity of Japanese investments in machinery industries is high relative to those made by other countries (1983 figures put employment per US$1 mn. of Japanese assets in the machinery sector in Asia at 59 people while the corresponding figure for USA is about 15% lower), the employment effect as well as the foreign exchange effect is significant. Finally, the absence of FDI by US companies in Sri Lanka implies that nothing can be expected from capital spending by subsidiaries.

The report has suggested that the Asean countries may be Sri Lanka's closest competitors in the region, in the sense that they too are actively seeking foreign collaboration and do not (with the exception of Singapore) yet have sufficiently strong domestic industries of their own. As a prelude to exploring possibilities in Sri Lanka, Table 27 brings together some characteristics of the MT industry in 5 Asean countries (excluding Brunei). No satisfactory estimates of the overall value of output could be obtained but other aspects of branch structure and the approach of governments to MT could be ascertained; the main findings can be summarised as follows. First, the number of producing firms is small, around 10 to 15 - the higher number for Malaysia includes quite a few metalworking and woodworking enterprises whose elimination would certainly reduce that country's total to the same range as elsewhere. If this number, unweighted for size of employment or value of output, is compared with numbers in other countries, then the Asean average is not much more than 10% of the industry size in, say, Japan or Republic of Korea. Second, there is an absence of leading firms i.e. enterprises which have a powerful investment and production base. Thus in Indonesia commentary in 1986 on the plans to enhance the branch stated "The government has authorised 11 companies to expand and develop their machine tool activities. Until now firms have only been small and have not been able to compete with imports."[3/] There does not, furthermore, appear to be evidence of a State sector firm of significant size operating in any of the countries. Third, and closely related to the preceding point, all Asean countries recognise a dearth of investment in MT notwithstanding the importance assigned to it in national planning. As described in the last section of Table 27, the inherent risks of MT production tend to be accentuated in the developing country context: whereas events of the present decade have been as an earthquake in several OECD countries, bringing down many firms and forcing others to be rebuilt on totally different structural bases, in Asean they have acted as a brake on getting the industry off the ground.

Reports from specialised industry sources emphasise both the continued wish of countries to enhance production and their recognition that FDI offers the most promising route for achieving the aim. Thus a 1985 analysis stated "Although a country that can now produce 1550 machine tools a year, Indonesia's newest 5 year plan calls for production of 21,000+ metalworking machines per year by 1989...Present facilities could manage 3,600 units per year by then, and the rest will have to come from new facilities from joint ventures and foreign investment. Indonesian technology officials have announced they would prefer to get the capital and knowhow from the US machine tool industry."[4/] Moreover, in early 1986 the importy duty on MT was raised by some 15% with the purpose of encouraging greater domestic output; thus far, however, there is scant evidence that FDI has actually occurred. In the

case of Thailand there was an undisguised 1986 initiative by the Board of Investment to encourage US metalworking and machinery firms to locate plants in the country. Thus: "Thailand has moved into a better position to compete for US manufacturing operations in the wake of rising labour costs elsewhere in Asia, including Hong Kong, Malaysia, Taiwan and South Korea. It has a sizeable pool of engineers and technicians and its assembly line workers make less than US$4 per day. Going wage rates for skilled workers range up to US$6 per day, while typical salaries for technicians and engineers are US$150-250 per month and US$300-500 per month respectively. Benefit packages usually come to about 50% of wages and salaries. Standard government incentive packages include investment guarantees, up to 8 years of corporate income tax and business tax exemption, duty free import of machinery, equipment and basic raw materials and components."[5/] In the Thai case also the impacts of this drive to encourage FDI have yet to be realised. Obviously there are 3 kinds of time lag in this process viz. the information lag from Government to potential investor, the approval lag for acceptance by the Board of Investment of any proposed FDI, and the gestation lag for turning an accepted proposal into an actual production operation. Together these lags are quite sufficient to account for the absence of actual start-ups till now. The passage of time could well lead to a marked reduction of the information lag and possibly some cutback of the approval lag. Yet the gestation lag is always likely to be present, especially in an industry as volatile as MT: market conditions can alter between the date a proposal is put together and the time the investment is ready to begin.

Returning to Table 27 the fourth point to underline, and one of considerable importance, concerns the type of product and production technology prevailing in Asean. Singapore stands apart from the other 4 nations with a profile resembling the advanced OECD countries i.e. emphasis on metal cutting using equipment of recent vintage and certainly with some export orientation. But the 4 largest Asean countries are in a quite different context. Although they have roughly the same number of firms as Singapore, what these firms actually do is by no means comparable. To begin with their concentration of activity is towards metal forming, using machinery of no more than an intermediate kind and often obtained second-hand. The average age of machinery is therefore high relative to the stock found in more advanced production locations (this statement can be made with some confidence due to the introduction of new technologies) and the equipment is being used to produce for specific orders rather than large batches. Now it is true that MT demand anywhere has a substantial job order component but a stronger sector where firms have more flexible production equipment can usually manage (except in phases of very limited demand) to keep low rates of machine downtime and reasonably high and stable levels of capacity utilisation. These indices are definitely unfavourable for the Asean countries and must lead eventually to higher product prices and/or lower company profits than would prevail in a situation where the sector was stronger. The reliance on imported raw materials accentuates the problems not so much in the familiar sense of the risk that foreign exchange will be unavailable (though this might be a difficulty on occasion, especially in Philippines and Indonesia) but because of the disjuncture between material quality and equipment vintage. There is currently a contradiction between the declared aims of augmenting MT quality and the tools at the disposal of the industry to achieve that objective. In Asean the sector is thus awaiting its own definition - how to combine the simpler, lower grade requirements for many branches of local output with the undoubtedly essential introduction of progressively more advanced technologies to support the modern industries. Each of the 4 countries (leaving aside

Singapore) will have a different response due to the varied industry mixes they possess and as of now there is no sign of any elements of a common approach.

The Asean example is highlighted to show how difficult the task is for Sri Lanka, which is in a weaker position than any of the 5 countries. The next sub-section moves to the Sri Lanka situation on its own.

III.2. Manufacturing and Foreign Direct Investment in Sri Lanka

In the past decade manufacturing activity in Sri Lanka has been aimed to a considerable extent at obtaining foreign exchange. The route chosen to achieve this has been the encouragement of FDI and that, in turn, has been channelled through 2 organisations, the Greater Colombo Economic Commission (GCEC) and the Foreign Investment Advisory Committee (FIAC). The former deals with export oriented FDI as such in the Sri Lankan Investment Promotion Zone (IPZ) while FIAC handles all other external investments. In ownership terms the formal difference is that while FIAC transactions are of a JV nature where at least half the equity capital is registered in the name of a Sri Lankan physical or legal person, the GCEC operations can be wholly foreign owned. In practice a certain number of exceptions have been made for FIAC arrangements, principally for some construction development, large capital intensive operations and projects providing substantial export potential. The importance attached to the export thrust can be judged by the fact that the GCEC, administratively headed by a Director General, is immediately responsible to the President of Sri Lanka. FIAC, as the title says, is an advisory institution with the Committee itself chaired by the Deputy Secretary to the Treasury and including secretaries to other ministries as well as others, not least the head of GCEC. Back-up support to FIAC comes through the International Economic Cooperation Division (IECD) of the Ministry of Finance and Planning and it is responsible for what amount to information brokerage activities in relation to collaborations in JV agreements. The institutional location of both FDI bodies mirrors most sharply their preoccupation with financial matters, whether in foreign exchange or otherwise. This point is of some consequence when dealing with MT.

To put the foreign linked projects in the whole industrial context, Tables 28 and 29 describe the role of GCEC and FIAC firms as industrial employers and industrial exporters respectively. Their combined employment share as of end 1985 was about 28% with close to three-fifths of that in GCEC, and their combined export share much higher, approaching 45% at end 1985 of which over one-third came from FIAC approved activities. Industrial exports as a whole rose by greater than three and one-half times from the end 1970s to the mid 1980s - the increase in the GCEC/FIAC combined share was almost sixfold and in absolute terms the GCEC/FIAC rise accounted for 60% of the whole increase in industrial exports. Domestically tied industry thus continues to occupy the predominant place in the overall context: in output terms the locally oriented factories contribute about two-thirds to MVA while public sector plants, which have little in the way of foreign JV, contribute a little over one-half (if the State Petroleum Corporation is taken away then the contribution is roughly one-quarter). These comments are for industry as a whole, of which manufacturing is just over one-half. Hence the shares of GCEC and FIAC would rise substantially were they computed on a manufacturing basis: the issue in the metalworking and MT activities will be to see what part of them are and could be handled by FDI ventures.

To go further into the existing pattern of FDI means examining the nature of projects actually in operation under the jurisdiction of the 2 authorities; Table 30 gives the GCEC data and Table 31 that for FIAC. Under both authorities the number of operation projects is substantially less than those approved; the tables leave aside the information on approvals and deal strictly with projects actually working. GCEC statistics do not give a cash value of investment to compare with the Rs.3.7 bn. for FIAC projects but one source gives the cumulative figure for 1979-1984 as roughly Rs.2.7 bn. If the annual average contained in that figure had been maintained through 1985 and 1986 then the cumulative value of investments in GCEC as of beginning 1987 would have been approximately Rs.3.8 bn. This implies a larger average size (measured by capital invested) of project for GCEC and in general a substantially larger foreign investment in absolute figures for the average project in GCEC as opposed to FIAC. In the latter average project size is just under Rs.30 mn. and the foreign share just over 30%, meaning that FDI per project was probably around Rs.10 mn. For GCEC a figure of at least Rs.20 mn. of FDI per project seems a fair reckoning. The GCEC numbers show JVs with local partners account for just over half the cases and that each of the half a dozen leading investor countries, that together signify half the cases, also have around one half of their projects as JV. Although explicit export figures for GCEC are not given it is known that a very high proportion of output is in fact sent abroad - but Table 31 reveals that the export ratios for FIAC projects are also extremely high.

Of major interest for this report is the degree to which projects even loosely related to MT have been implemented under the approval of GCEC or FIAC. Table 31 gives figures for the broad category of basic metals and engineering (of which, it will be recalled, MT is but a small part) and shows that all FIAC authorised investments there came to around 4% of the FIAC total, that just over 3% of the direct employment generated was in this broad category, and that none of the output was exported. GCEC investments, as Table 30 indicates, were mainly in textiles and garments: information obtained in an earlier study by UNIDO covering the 1979-1984 period shows zero FDI in basic metals and only Rs.90 mn. in fabricated metal products, machinery and transport equipement which once more means around 3% of the total. Overall, therefore, in projects coming under the aegis of the FDI authorities the '3% rule' seems to prevail as far as basic and fabricated metal products are concerned i.e. the sector accounts for that proportion of manufacturing investment and employment whatever type of FDI regime is followed. Moreover, data on value added for fabricated metal products and non-electrical machinery covering the whole of manufacturing i.e. whether or not foreign investment is part of the capital base, suggest that their joint contribution is no more than 3%. It bears repetition that MT proper is only a small part of this. Within a manufacturing economy where capital goods are a relatively minor share of total output and in any case are on the decline, MT certainly do not figure other than on the periphery.

The preceding comments are put into sharp perspective by Table 32 which provides a few performance indicators for the years 1977 and 1984 in the branch of fabricated metals. MVA and employment shares fell from around 5.5% to the 3% level and there were no exports to speak of throughout the period. Though dependence on foreign raw materials fell somewhat it remained high (as for the Asean countries discussed in the preceding sub-section). The only clear improvement was in regard to capacity utilisation though even there the change may be partly attributable to the elimination of a few firms. Aggregate output of MT, though impossible to determine accurately, can only be

tiny. For, to use 1982 figures where full comparability can be obtained, the situation was as follows. MVA was around US$750 mn. of which fabricated metal products did not account for above US$30 mn. If the ratio of value added to gross output was even as low as one-fifth, then the latter aggregate would have been around US$150 mn. of which MT was only a tiny part.

Table 33 gives the data for imports of metalcutting MT and shows that in 1982, a quite low year for trade, gross imports were close to US$2.8 mn. Combining this with the gross output approximation just described shows that the contribution of local MT production to apparent consumption might have been as much as three-quarters (if MT accounted for the high proportion of 5% of gross output of fabricated metal products) or as low as zero, if in fact MT production strictly defined is non-existent. Survey data by ESCAP suggest the latter is closer to the truth i.e. that what actually takes place is metal working of a fairly traditional type. On this basis the current situation is one where domestic production, heavily reliant on imported raw materials, meets part of the demand for what is probably a mixed bundle of fabricated metal products and there is an annual import of MT anywhere from $2-6 mn. Given foreign exchange shortages the import figure is probably a low estimate of real demand in the economy but even so it would seem that local MT requirements are currently quite small. This is explained both by the limited total size of the industrial sector and its composition which is towards branches relatively light in the use of MT. Sri Lanka not only lacks the production base for MT, it also lacks the demand. In a more developed industrial economy there is a synergy between MT production and the structure of industrial output but in Sri Lanka that situation does not exist nor is it likely to in any time-horizon relevant for present purposes.

So it is that the government is considering MT essentially as one possible vehicle towards expanding and diversifying its foreign exchange earnings from cheap labour based manufacturing. Production is not seen in the perspective of domestic requirements (though there could be minor spinoffs) nor does there seem to be any intention of a progressive absorption of technology with a view to establishing independent locally controlled operations. Instead the hope is to derive net foreign exchange receipts in return for supplying cheap labour. What does this mean in practice?

III.3. Experience and Prospects in Metal Working and Machine Tools

As an approximate guide to what is happening in the broad area of metal fabrication with FDI involved, the listings of firms operating under GCEC and FIAC authority have been examined to single out those having some involvement in this area. From the GCEC list, valid as of end January 1987, only 3 companies with even a loose connection to the area of interest to this report could be identified. They were: Mono Pumps, a wholly owned UK firm producing industrial and irrigation pumps (this enterprise had ceased operation by end April 1987); Alloy Fabricators, a tripartite JV of UK, Norwegian and Sri Lankan interests, making piping systems; and Precision Moulds and Tools Ltd., a JV of FRG and Sri Lankan interests manufacturing moulds and tools. From the FIAC list, valid as of end June 1986, there were again only 3 companies with some relation to the subject matter of this report. They were: Eastern Auto Parts (Pte) Ltd., a JV with Denmark aimed at renovation of automotive components; Lanka Askok Leyland Ltd., a JV with India in the area of assembly and progressive manufacture of motor vehicles; and Swedlanka Engineering (Pvt) Ltd., a JV with Sweden for the manufacture and designing of moulds, dies and special machines. To obtain a feel for the situation contact was made by

correspondence and 'telephone interviews' with some of these firms; the following paragraphs give a rough sketch of the situation in 2 of them, Mono Pumps and Swedlanka Engineering.

Mono Pumps functioned for 6 years under GCEC authority manufacturing industrial and irrigation pumps for export, primarily though not exclusively to other Asian countries. The UK based company, which also has operations in Australia and some other countries outside of Asia and the Pacific, was originally seeking a cheap labour base mostly for assembly operations though with some simpler engineering operations as well. Initially the company's preferred location had been the Philippines but that was rejected for reasons of suspected political instability (this was in 1980); Singapore and Hong Kong were also considered with their plus points being their engineering capacities but the firm felt that geographical location was not quite adequate and that Sri Lanka could provide adequate quality at higher profit to the company. Mono Pumps emphasises that labour costs were not a particularly big item in total output charges (they were much smaller than materials costs) t . they were the only cost component that could be pared down through relocation. Production was set up with already used equipment relatively demanding of less skilled labour. It was pointed out that the absence of local infrastructure for maintenance precluded the installation of best practice machinery and that, though the 6 years activity did demonstrate that Sri Lankan engineers could handle the equipment installed very well, the country would not come into the realm of possibilities if sophisticated equipment was to be utilised. In such a case the preferred locations in Asia would be Singapore and Hong Kong. Moreover, the company pointed out that absence of a sufficiently elaborate local engineering network rendered local subcontracting extremely difficult. During the 6 years life of the investment in Sri Lanka local sourcing of castings was eventually achieved (originally they were imported from Taiwan, Province of China) but, had the factory been set up in Singapore, Republic of Korea or Taiwan, Province of China, it seems that a high degree of local subcontracting would have occurred from the start. In its operations the firm employed some 40 to 50 people and stressed that their on the job learning and real productivity were fully satisfactory.

Why has Mono Pumps closed down? The crucial reason has been the introduction of a high degree of automation into the production process which has made it economically beneficial to relocate output to UK. New machines, functioning around the clock 6 days a week and which necessitate only 8 semi-skilled operators, make it more economical to produce in Manchester and export from there. The fact that Manchester is at the centre of a region with a rich engineering tradition that continues to be closely involved with machine building is also a factor of significance - the company stresses that if any problems arise with the equipment then "someone down the road" will be able to help solve them. Were it not for the fresh technology of production Mono Pumps would still be in Sri Lanka and the company emphasises that if some intermediate level activities with export of production were to present themselves it would be very willing to return since its experiences were good. Production has ceased simply because cheap labour is no longer a strong enough asset in the business.

Swedlanka is a case of great significance, indeed unique since it is the only firm explicitly engaged in part of the metal working field. The agreement to establish the company was finalised in April 1985 and production started in July 1985 to make tools and dies for plastic rubber and metal manufacturing industry. The capital composition of the company is unusual and

of considerable interest as a pointer to possible accords in the future. Participation of Swedish groups involves both Swedfund itself, with 24% of the stock and Conrit AB, with 25%. Initially the Sri Lankan involvement came from 2 Tamil entrepreneurs but they withdrew towards the end of 1986 and now the domestic shareholding is 41% for Phoenix Ltd., a private company, and 10% for the National Development Bank. Thus there are 2 public sector financing agencies, together holding just over one-third of the investment capital, and 2 private firms. Total share capital is Rs.4 mn. out of a total investment of Rs.9 mn., part of the funding coming through loans raised in Sri Lanka. The genesis of the project reflects both the public/private combination in Sweden and the difficulties experienced in the European MT industry. For Conrit, a relatively small firm, was experiencing increasing problems in competing from its Swedish base and was faced not only with the need to reduce unit costs but also the necessity to expand its market. Swedfund was instrumental in seeking out the Sri Lanka possibility and has financed the critical training component for Sri Lankan toolmakers in Sweden. This has permitted the current combination of low labour costs and qualified staff (employment is now in the 25-30 range) without which the operation would not be viable.

As of 31 March 1987 the company completed its first full year of operation with a turnover of Rs.5.2 mn. which, after allowance for all charges, was not much below the break-even point. The company assesses that its output is high quality and is exporting a considerable proportion to Western European markets including Sweden itself, FRG and Switzerland - the initial export requirement was one-quarter of output but this may well be exceeded. It appears that freight costs are not significant and thus do not present any obstacle as far as exporting is concerned. Marketing is clearly a vital activity since Conrit is not a sufficiently big company in Sweden to hold any captive market of its own. But Swedlanka has 2 advantages: first, though Conrit may not be large at home it does possess all the local knowledge to ensure that a quality low cost item can break into the Swedish market; and second, the Managing Director of Swedlanka is a person who already had detailed information on and many contacts in the other European countries and was therefore able to move the product much more quickly than would normally be the case. Thus far, it will be noticed, Swedlanka is not selling elsewhere in Asia nor is it by any means a standard subcontracting activity - it is beginning to take a life of its own.

How does Swedlanka fare in a somewhat broader perspective? The company thus far is well pleased with operations in Sri Lanka but has emphasised various issues of a system nature which are germane to investment decisions that other firms could consider. To begin with, the absence of infrastructure complicates the management problems. There is serious underdevelopment of the small industry network which renders subcontracting a difficult job. Now the company argues that these matters are ones of a long term nature and that to carry out a transformation of the industrial economy in this way requires a basic stability of approach which cannot be achieved even in the space of a decade. In contrast to Singapore, Republic of Korea and Taiwan, Province of China where the same focus has been maintained now for at least 25 years, and where the linkages of public and private sector, large businesses and small, are so intense as to allow virtually immediate use of local subcontracting (save for very sophisticated items), Sri Lanka has, over the longer time horizon, had some major shifts of perspective. The message appears to be that what is lacking is the integration of a series of emphases which, in themselves, are fully acceptable and indeed represent the pivots of an economy and society able to progress under existing conditions of the international

system. Put briefly the cornerstones so far laid are the establishment of basic education and health schemes which provide the essentials for human resources to develop, the use of public investment to set up the physical infrastructure and some agricultural and industrial activities which offer a context for business, and an orientation towards export in manufacturing without which the country cannot easily tackle its twin obstacles of foreign exchange scarcity (Sri Lanka has no power over the international markets for its major commodity exports) and limited domestic market. These elements need to be blended together instead of being treated as antithetical e.g. the supposition that somehow an export orientation in manufacturing is incompatible with an important presence of public sector firms in those industries where private capital is not readily forthcoming. In effect the view from the foreign investor side is saying that the more the public/private, large/small industrial sectors in Sri Lanka work together, the more not only domestic investment will be stimulated but the more encouragement foreign investors will also have. Even now there is a view of the groups as antagonistic, adversorial which prevents any coherent strategy from fully unfolding.

Swedlanka, as other companies, notes the major shifts in production cost structures and levels now sweeping through the industrial sectors of the OECD countries and particularly pronounced in the HT and engineering branches where the combination of the electronic with the mechanical has totally altered the nature of processes (allowing a felicitous mix of batch and custom-made production) and drastically changed the skill requirements for staff. Production in Sri Lanka is highly vulnerable to these developments and that creates real tensions around investment decisions. Swedlanka lays strong emphasis on the time required to build marketing channels and establish long term customers: even if original investment costs can be recouped relatively quickly, medium to long term profitability is a function both of continuing cost efficiency and quality maintenance (variables which depend, among other things, on whether significant technological changes are occurring) and the ability to retain a marketing grip. The problem is that Sri Lanka has a cheap labour edge but that is constantly liable to erosion (or even a sudden landslide) due to technological changes. Consequently the single edge of labour cost is not enough: what is required is at least a second asset, preferably of a system kind, which can provide some cushion against technological improvements (at least within a range). It is the long term building of that asset which has to be the focus not only of policy, seen as a succession of manouevres, but of strategy. This is not the same as economic planning as it has been conventionally understood and widely castigated. It is a social cum economic process of integration which recognises that domestic entrepreneurship devoted to long term profit making through industrial production (as opposed to financial speculation and trading) is essential to improving not only the wealth of the economy but also its resilience in the face of external shifts. That entrepreneurship will only flourish if public sector support is available and if the public sector is committed to creating a well defined type of economic structure. The common feature of the economically successful Asian countries has been precisely the sharpness and insistence of that definition.

The case sketches express perhaps more graphically than any figures the high risk option which Sri Lanka is pursuing (and which in the short term it may have little alternative but to follow). Yet to put Sri Lanka's investment costs in perspective a quick glance at the numbers is useful. Table 34 brings together, for the latest year for which a sizeable sample of countries on a

comparable basis could be obtained, data on hourly wages and labour costs in the export zones. The numbers tell their own story: Sri Lanka is by far the cheapest location with costs of half to one-third those prevailing in Philippines, Thailand and India. The table shows vividly how (and recall these are 1983 data) Hong Kong, Singapore and Republic of Korea have become, in the Asian context, high labour cost locations and have therefore been driven to seeking other advantages to sustain their export thrust. On any assessment, and especially when the discipline, skill and literacy levels of the Sri Lankan labour force are kept in mind, the country is unquestionably the cheap cost site.

Since the latter half of 1985 there has been a major realignment of exchange rates, especially in the $/Yen parity. This has altered investment costs in different countries according to the behaviour of their currencies; the results likely for the 2 year period to end 1987 are given in Table 35. The only countries, as compared with Sri Lanka, which are becoming cheaper for investors both in $ and Yen are Indonesia and Philippines with the numbers for Malaysia not much different. At one level this confirms the view expressed earlier in this report that it is the Asean countries which are Sri Lanka's competitors: they have the lowest labour costs (fragmentary information for Indonesia suggests that could it have been included in Table 34, its rates would have been closest to those for Sri Lanka) and their exchange rates are just as likely to devalue as Sri Lanka's with their export earnings reliance on a few commodities and political unrest contributing to a lack of confidence in the economy.[6/] But taken from a different angle, the information of Table 35 suggests some other conclusions as well. First, nothing much is to be gained by any further attempts at competitive devaluations, cuts in wage rates or efforts to improve incentives for foreign investors. Not only are they likely to backfire, in that neighbouring countries will probably modify policies to neutralise the shifts, but they would seriously call into question the net benefits to Sri Lanka of the export oriented manufacturing thrust. Due to the absence of data this report has been unable to present net export earnings estimates but they are certainly not that substantial due to the import content of export directed manufacturing production. Any further policies allowing part of the benefits to be taken away would leave the country with little to show for its efforts. Second, the obvious course for Sri Lanka is to try and combine some of the low cost advantages with those of a sophisticated supporting service sector, as indeed exists in Hong Kong, Singapore and elsewhere in Pacific Asia. That means encouraging investment of a different kind such that, for example, efforts in MT could obtain local assistance from computer software specialists. Third, Sri Lanka will, if it wants to remain on the export path, have to go beyond the cheap labour issue to try and capitalise other assets e.g. location. Certainly efforts of that kind are not helped by the present political unrest in the country.

Currently Sri Lanka is looking at half a dozen areas where FDI might be encouraged. A couple of them are ones where a certain amount of investment has taken place viz. gems and jewellery, and consumer electronics, while the

laid out by the government when establishing the IPZ or necessarily picked the most suitable projects from foreign exchange considerations. Despite its endeavours through distributing information and so on the administration has not taken a sufficiently active stance with regard to attracting the kinds of FDI Sri Lanka is looking for. The material provided in this report demonstrates the complexity of the MT industry and the need to pinpoint particular niches where some opportunities might exist. That can hardly be done without sending experienced staff overseas to check for themselves what the possibilities really are: if the phrase 'priority sector' is to have an active rather than passive connotation then operational steps to do something in that sector must be taken. So far these steps have not been forthcoming. Moreover the relative success of the Swedlanka venture hints at the possibility of generating projects of a triangular kind, where foreign capital comes not only from industry but also financing institutions, whether public or private sector. That kind of possibility too is best stimulated through active field search by Sri Lankan staff, which could easily include public and private sector people.

III.4. Summary Remarks

This concluding chapter has underlined still more the message of the earlier ones viz. that the MT industry is nowadays almost totally taken up with an internecine struggle among the leading OECD countries in which even the Asian NICs are largely on the periphery. Although to date there is little evidence of substantial FDI as a response to the competitive tensions it is very possible that FDI and other forms of collaboration will become prominent in the near future (meaning the next year or so). But the signs point strongly to an OECD focussed investment with involvement of developing countries quite marginal. The information on Asia in this chapter shows that Japan has, relatively speaking, paid much less attention during the past 2 or 3 years to the continent and that Sri Lanka in particular is more or less off the investment map. Other OECD nations are also less interested in pursuing cheap labour locations and hardly at all in MT activities.

Within the Sri Lankan economy the role of capital goods in industry has been declining and the FDI in manufacturing that has expanded so much in the past few years shows a mere handful of firms loosely related to engineering and metalworking. Examination of what are probably the 2 most instructive cases reveals a close concordance of opinion about the advantages and disadvantages the country possesses. The labour force is excellent, learns quickly and is unquestionably cheap in relation to its productivity: if production depended on that alone then Sri Lanka would be top of the list. But today engineering/metalworking firms are looking for other perhaps more important things. Sri Lanka badly lacks infrastructure and a network of small industries suitable for subcontracting - only intermediate technology activities, at most, could be located there. If Sri Lanka hopes to be a possible location for this type of investment in the future then a qualitative leap must be made through system investments. Assets other than cheap labour and cheap currency have to be created. The country takes too lax a view of the marketing issue: much time and money goes into market building and neither Sri Lankan partners nor the authorities handling FDI seem to have given enough attention to the point. When local manufacturing does not have a high proportion of intra-firm trade and export markets, particularly in more specialist items such as MT, have to be created, this weakness is significant. These structures are brought into strong relief by the evidently high risk of technological changes which cut the ground from under the feet of

cheap labour and prompt companies which have invested to relocate as well as deterring other would-be investors.

Attempts to obtain FDI in MT and similar activities will thus require a more active and imaginative series of actions in the short run, aimed at individual investors, plus a conscious move towards system building in the medium to long run. Export oriented manufacturing predicated on cheap labour cannot be a development path to be followed for always but only a step towards upgrading human and material resources so that domestically initiated and operated activities can keep pace with changes externally. The absence of this perspective in Sri Lanka severely complicates the short-run task of finding projects yet even so more should be done. Field staff are required with substantial sectoral expertise. The contacts they make should reach beyond individual firms to public financing agencies in the OECD countries and the commercial banks. Given the very slim chances of obtaining FDI by large MT companies the efforts may have to be devoted to smaller producing countries and/or smaller firms (which could of course generate enterprises big in the Sri Lankan context). Investment authorities in Sri Lanka will have to scrutinise carefully the bases on which any possible MT investments might be made. All known attempts to develop MT production have been just that i.e. part of a comprehensive attempt to develop local industry. Sri Lanka does not want MT output for that purpose, however, although certainly some FDI based production would serve the local firms. Instead MT is wanted as a foreign exchange earner. Yet the message that seems to come from foreign firms is that their effectiveness as foreign exchange earners may well be enhanced if they can make better use of local support facilities. In trying to promote FDI in this sector Sri Lanka might therefore be compelled to widen its scope of assessment.

The report has shown that, from several points of view, the Asean countries are the ones closest to Sri Lanka in this area. In the past there were times when a closer association with these countries was proposed: but even were that to occur in the future, Asean does not have any sectoral policy which could stimulate production in this area. So from a regional perspective there does not appear to be much advantage to Sri Lanka seeking any association. Elsewhere internationally, as the report has stressed, Sri Lanka is not closely linked to any arrangements which could encourage production in MT. Probably the best that can be done is to strengthen ties with some of the smaller OECD producers and try to work up from there. All in all the prospects are slim indeed - whatever can be acquired in the way of FDI in MT will be through Sri Lanka's own efforts and very much against the current.

1/ South, "The Rising Sun: Cutting Out Asia", February 1987, p.58.

2/ idem.

3/ Nachrichten fuer Aussenhandel, "Branchenbild: Die Werkzeugmaschinenindustrie in Indonesien", 3 February 1986, p.sc2.

4/ American Metal Market, "Indonesia: Toolmakers Wanted", 14 January 1985, p.16.

5/ Iron Age - Metal Producing Management, "Thailand asks US Firms to Locate There", 17 January 1986, p.16.

6/ It is claimed that so far the internal strife has not affected foreign investment behaviour. However international air communications have been reduced (at least for passenger traffic) and the persistence of problems will certainly reduce investment incentives in Sri Lanka as compared with other countries.