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MULTINATIONALS AND TRADE

Trading multinationals - the example of Hungary and the USA



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THE INTERNATIONAL INTRA-FIRM TRADE OF US CORPORATIONS. IMPLICATIONS FOR THE DEVELOPMENT OF TRADE THEORY

The development of capitalism has reached a new historical phase, in which world trade is dictated by foreign direct investment (FDI). In the 19th century, transactions between countries were mainly conducted in goods, to which portfolio investment was added in the century's closing years. FDI gained importance in the 20th century, particularly after the 1960s, due to worldwide operational expansion by multinational corporations. While trade in goods maintains its importance, it is now under constraints presented by FDI.

This shift in the structure of international transactions is reflected in the literature on the subject. Although extensive research has been conducted on FDI, there has not been a significant development in the international trade theory since Leontief (1956). Important papers on FDI include Hymer (1960), which identifies issues regarding multinational firms, Vernon (1966) and Wells (1972), which discusses trade in the context of FDI, Buckley and Casson (1976) on trade and FDI as alternatives, and Dunning (1977), which analyses FDI based on corporate ownership, internalization and location theories.

The FDI in the 1960s was led by US corporations. European countries were still completing their recovery from the devastation of the Second World War and adjusting to the European Economic Community, which had been established in 1958. Only US firms had attained the level of technological capability and capital accumulation to allow overseas investment. Then in the 1970s, European companies began to invest in US markets, which was followed in the 1980s by Japanese investment in the United States and Europe. The emergence of Japanese companies meant there was a network of FDI covering the entire world economy. At the same time, some developing areas of

the world were also being connected to this network. Latin American countries and Asian economies began to receive direct investment from rich countries in the 1970s. This process accelerated in the 1980s, gaining further momentum after the collapse of the socialist regimes and integration arrangements, notably the Soviet Union and COMECON, which was dissolved in 1991. Matters finally reached the stage where the world economy (including China and Vietnam, although they did not abandon their socialist political systems) was encompassed by the web of foreign investment.

Figuratively, individual companies in the world economy used to be regarded as islands or rocks in a huge ocean, which was an image that reflected the economic realities of the 19th century. Corporations long remained subordinate to the economic framework dictated by each country's political authority, even in the first half of the 20th century, when corporations had already accumulated the assets and capital to emerge as oligopolists in their respective home economies. The progress of FDI brought a profound change in this relationship between corporations and countries.

This paper seeks to shed light on the characteristics of the world trade structure that have evolved since the 1960s. This calls for an examination of the international trade in goods, conducted by multinational and transnational corporations,¹ which reveals

¹ It is important to look at the degree to which a multinational company has attained globalization, since this facilitates understanding of the company's development stage as well as its integration into the world economy. For example, UNCTC (1993) classified corporate development in three stages. The first was 'stand-alone, multi-domestic', where a parent company dealt directly with its subsidiaries in overseas markets. The second was 'simple integration, outsourcing', in which procurement and outsourcing became part of in-group activity. The third was the

that it is no longer appropriate to analyse international trade solely in terms of the traditional comparative-advantage theory. This inquiry is based on data from US corporations, as they constitute the core of the modern multinational corporations.

1. MULTINATIONALS AND SOVEREIGN COUNTRIES IN THE WORLD ECONOMY

This paper argues that capitalism entered a new phase of historical development in the 1960s. Multinationals expanded their operations and accumulated assets throughout the world, to such an extent that their size and management capacity relieved them of the constraints of national economies. These days they are beginning to gain economic and political influence on a scale obtained only by sovereign countries in the past.

Table 1 lists the GNP of 51 countries and the revenues of 49 multinational corporations, according to their size in the fiscal year 1998. The country data are from the World Bank (2000) and the data for multinational corporations from Fortune (1999). Caution has to be exercised, because of the difference of definition of the two statistical concepts 'GNP' and 'revenues', and because of the different coverage of the term 'revenues' in individual industries. Nonetheless, the table is useful in several ways:

1. Many multinationals have reached a size greater than many smaller national economies. For example, there are only 23 countries whose GNP exceeds the revenues of the largest multinationals, such as General Motors, Daimler-Chrysler and Ford. This implies that multinationals have emerged as a deci-

sively influential force in the world economy, including the trade structure.

2. These large multinationals operate in a variety of industries. Nine of them are motor vehicles manufacturers, seven are trading houses, and six are in electronics. The rest include four corporations each in banking, life and health insurance, and oil refining industries, three in non-life insurance; two each in computers, food, and communications, and one each in aerospace, diversified finance, food and drug stores, speciality retailing, package and freight delivery, and tobacco. These corporations alone cover as many as 16 industrial categories.
3. The table contains almost equal numbers of multinationals based in Japan (16 corporations), the United States (15) and Europe (18). Of the last, seven are German, two each are British, French, Italian, UK and Dutch, and Swiss, and one is wholly Dutch. These observations show how the multinationals have emerged as the main driving force behind the world economy. Their relationship to countries can no longer be discussed in the context that applied until the mid-20th century.

2. US MULTINATIONALS AND THEIR PLACE IN WORLD MARKETS

This section examines the industrial structure of the activities of US multinationals and the locations of their subsidiaries outside the United States. *Table 2* shows how 2618 US parent corporations owned 22,871 overseas subsidiaries in 1997. This includes affiliates in which US corporations were minority shareholders. Classified by industry, more than 57 per cent of parent companies were manufacturers, while each of wholesalers, services, and finance and insurance areas was represented by more than 200 companies.

An average of 8.7 foreign affiliates was owned by each parent. This figure was highest in the petroleum industry (18.5 affiliates), followed by chemicals (16.2), trans-

'complex international production' stage, where regional linkages among parents and affiliates were established. Although the author's observation is that a 'transnational' corporation has achieved a more solid international network, especially linkages among overseas affiliates, the term 'multinational' will be used in this paper for multinationals and transnationals.

portation equipment (16.1), and food (15.9). The average number of foreign affiliates was 9.4 in manufacturing, 7.3 in finance and insurance, and 7.2 in the services. The overall average of almost nine affiliates compared with an average of almost ten where the parent corporation was in manufacturing.

Table 3 presents the geographical locations of the affiliates of US parents in 1997. The network of US foreign affiliates covers as many as 166 countries, which was 79.4 per cent of all the countries in the world identified by the World Bank (1999). While this presence in a large number of countries is itself an important fact, it is also significant that such former socialist countries as the Czech Republic, Hungary, Poland and Russia each hosted about 100 affiliates, while China was home to 350 of them. The source table also reveals that US affiliates were present even in Vietnam and Cuba, and that there were as many as 481 affiliates in Eastern Europe as a whole. This location pattern for the affiliates of US corporations reflects their prominent role in transforming the former socialist countries into market economies.

Other frequent locations include regions in the Western Hemisphere where many affiliates operate in places known to be tax heavens: Bermuda, the Dutch Antilles and British Caribbean islands hosted 330, 78 and 175 US affiliates respectively. This suggests that one important function of overseas affiliates is to minimize tax payments by exploiting the opportunities that tax heavens provide.

The focus of this paper, however, is the fact that US affiliates are concentrated in industrial countries, *i.e.* Europe and Japan, in newly industrializing economies, and in developing countries with large domestic markets. This provides potential for international intra-firm trade, based on a division of labour among constituent companies,² which is the subject of the next section.

3. THE NETWORK OF MULTINATIONAL CORPORATIONS: INTEGRATING PRODUCTION

Table 4 presents data for analysing the intra-firm trade of US multinationals. A conceptual framework for the data in some columns of the table appears in *Figure 1*. The total export value of the US parent companies in 1997 (Column 12) was USD 401 billion for all industries and USD 337 billion for manufacturers. These figures came to 58.8 and 60.2 per cent respectively of the total US exports of goods for the same year – USD 688 billion for all industries and USD 559.7 billion dollars for manufacturers, as reported in CIA (1999). Multinationals account for about 60 per cent of all US exports. Column 13 reports the percentage of intra-firm trade in the US parents' exports. This was 45.6 per cent for all industries and 49.6 per cent for manufacturers. Of the latter, corporations in the computer industry showed the highest share (88.6 per cent), followed by motor-vehicle makers (78.0 per cent), electronics and electrical equipment (64.5 per cent), electronic parts (57.6 per cent), chemicals (56.4 per cent), and industrial machinery (53.3 per cent). More than half the multinational corporations' exports in these industries are destined for foreign affiliates, with computers and automobiles showing the highest shares.

This level of intra-firm linkage is present not only in the parent-affiliate relation, but also among the affiliates. There are active transactions of goods between foreign affiliates that, as was shown in *Table 2*, totalled 8.7 for all industries and 9.4 for manufacturers on the average in 1997. *Table 5* gives sales data of foreign affiliates by destination and sales breakdown within/outside the group. This is useful as a way of observing the linkages among affi-

² The author believes the term 'world intra-firm trade' to be more appropriate for describing in-group cross-border transactions based on the division of

labour within multinationals, due to the progress of world integration by multinationals. However, the commoner expression 'international intra-firm trade' is used in this paper, as the distinction between the two is not a main concern here.

ates in the same group and with the parent company, from the affiliates' viewpoint, although caution is needed because the data here is defined differently from the data in the other tables. For example, it reports sales (not exports), counts transactions of services as well as of goods, and does not include minority-owned affiliates. Especially worth noting is Column 13, showing the share of in-group transactions, *i.e.*, among affiliates, in sales to non-US markets. This share is 58.8 per cent for all industries and 66.1 per cent for manufacturers. The following sections of manufacturing industry have higher than average shares in this respect: 90.0 per cent for computers and office equipment, 87.8 per cent for motor vehicles, 85.3 per cent for drugs, 78.1 per cent for industrial equipment, and 69.2 per cent for chemicals. These percentages suggest substantial linkages between foreign affiliates themselves.

This linkage among foreign affiliates, along with the finding in Table 4 that approximately half the exports of US parent companies are destined for foreign affiliates, leads to the conclusion that US multinationals have already established their intra-firm trade networks across the world. This phenomenon is most pronounced in industries such as computers and office equipment, motor vehicles, chemicals, professional machinery, electronic parts, and electronics and electrical equipment.

As the strength of the intra-firm trade linkage is confirmed, it becomes increasingly relevant to investigate the composition of the intra-firm trade. *Table 6* examines the US shipments destined for foreign subsidiaries. The data are for 1994, as the breakdown data are available only in the benchmark survey. Predictably, shipments to foreign affiliates from the US are mainly conducted by the parent companies. This parent-company share is measured by the ratio of Column 6 to Column 1, which is 86.9 per cent for all industries and 84.0 per cent for manufacturers. The table also classifies shipments to foreign affiliates as (i) capital goods, (ii) goods for re-sale, and (iii) goods for assembly. Of these, the last category is important, as it reflects the efforts of US corporations to

relocate production capacity around the world. The percentage share of category of goods shipments for assembly is calculated and reported in *Table 7*. The share of goods for assembly represents a 54.0 per cent share of parent companies' total shipments to their affiliates in all industries and 82.8 per cent in manufacturing. Several manufacturing sectors exhibit significantly high percentages: 99.9 per cent for audio, video and communications equipment, 96.6 per cent for electronic parts, 95.3 per cent for electronics and electrical equipment, 92.4 per cent for food, 91.2 per cent for primary metals, 88.5 per cent for transport equipment, 85.5 per cent for drugs, and 83.2 per cent for chemicals.

The fact that most of the parent companies' intra-firm trade is accounted for by goods to be assembled by foreign affiliates has profound implications on the trade structure. The FDI is made with an eye to deploying production throughout the world, which may cause the trade pattern to become less consistent with comparative advantages.

4. TWO STUDIES OF INTRA-FIRM INTERNATIONAL TRADE

As intra-firm trade reached a considerable size in the 1960s, research in this area began in the United States.³ This section sets out to evaluate the current discussion about the intra-firm trade by looking at two studies conducted by the Bureau of Economic Analysis at the US Department of Commerce. This survey identifies the position that the US Department of Commerce takes on intra-firm trade. It is important to note that the studies cover an extended period, between the 1980s and 1990s, and argue that the emergence of intra-firm trade is structural in nature.

³ The US Department of Commerce conducted in 1966 a detailed census of FDI (US DC, 1996).

The Bureau of Economic Analysis published a report titled *International Direct Investment* in March 1999. This contains four chapters. They deal with the statistical methods employed in the publications *US Direct Investment Abroad* and *Foreign Direct Investment in the United States*; in four papers on FDI and its implications for the balance of payments; in six articles on multinationals and their patterns of production, procurement, distribution and trade; and in two papers on the establishment-level data. All these articles were previously published in the *Survey of Current Business* in the 1990s, with the two papers surveyed here, Whichard and Lowe (1999) and Zeile (1997), among them.

The primary aim of Whichard and Lowe (1999) is to analyse the US current account by breaking down cross-border trade according to whether it is between affiliated parties, *i.e.* units of multinationals, or unaffiliated parties. They further distinguish trade within multinational corporations (intra-firm trade) according to whether it is between US parents and their affiliates, or between US affiliates of foreign companies and their parents. This inquiry into the relationship between exporters and importers was not possible within the traditional current-account disaggregation framework based on commodity classifications of goods and services and geographic location of parties involved. According to the authors, the Bureau of Economic Analysis previously evaluated three possible frameworks for supplementing the information on cross-border trade in the standard balance-of-payments accounts. Additional information would be obtained, first of all, on sales and purchases abroad by foreign affiliates of US companies, and secondly on sales and purchases in the United States by US affiliates of foreign corporations. Both these frameworks use ownership as the basis for determining the nationality of transacting parties and thus the boundary between domestic and international transactions. The third framework differs from the first two in retaining residency for determining the boundary, while providing many new details that

would facilitate analyses of ownership relationships and the scope and importance of intra-firm trade. Whichard and Lowe (1999) extended the third framework in several ways. These included (i) placing the ownership-based disaggregation of cross-border trade in the framework of the overall US current account, (ii) breaking down the ownership-based components of cross-border trade into trade in goods and trade in services, and (iii) presenting estimates for the period 1982-93 rather than only one year. These steps demonstrate the process by which intra-firm trade has been consolidated in the balance-of-payments accounts.

According to Whichard and Lowe (1999), the patterns that emerge when the current account is viewed along ownership lines are the following:

- * Transactions within multinationals accounted for about one-third of US exports and of US imports of goods and services throughout 1982-93. Intra-firm trade accounted for a growing share of US imports of goods and services, with the share rising from 32 per cent in 1982 to 37 per cent in 1993. Much of the trade simply represented goods imported by US wholesale trade affiliates established by foreign companies to facilitate US distribution, largely to unaffiliated customers.
- * The share of intra-firm trade in US exports ended the 1982-93 period at the same level as it began. Intra-firm exports from US parents were used as channels for goods, including ones for further assembly by foreign affiliates.
- * Exports by US parents to foreign affiliates accounted for about two-thirds to three-quarters of total intra-firm exports. The rest were exports from foreign affiliates in the US to overseas parents.
- * Imports by US affiliates from foreign parents accounted for 55-64 per cent of total intra-firm imports. The balance consisted of imports by US parent corporations from their foreign subsidiaries.
- * Despite the importance of affiliates as distribution channels for parents' output,

most of the affiliates' sales were of local origin (or for foreign affiliates, non-US origin).

- * With these observations, Whichard and Lowe (1999) identified international transactions in the context of relationship between importers and exporters. *Table 8* tabulates the intra-firm trade data from figures provided in the study, which support the five observations just described.
- * The shares of intra-firm trade in total imports (Row 7 plus FM, divided by Row 6) were 38.9, 43.3, 52.3 and 47.2 per cent in 1982, 1986, 1990 and 1993 respectively.
- * The shares of intra-firm trade in total exports for the same years (sum of Row 2 and FX divided by Row 1) were 32.9, 34.2, 31.3 and 36.2 per cent respectively.
- * Of all intra-firm exports, the shares of US parent companies' exports (Row 2 divided by the sum of Row 2 and FX) were 67.6, 74.5, 72.7 and 72.0 per cent in the same years.
- * Of all intra-firm imports, the shares of foreign-owned affiliates' imports from overseas parent companies (FM divided by the sum of Row 7 and FM) were 55.9, 62.5, 62.5 and 59.2 per cent.
- * As for the sales of foreign affiliates, local sales and sales to other in-group affiliates exceeded sales to US parent companies, the ratio of the former to the latter (Row 5 divided by Row 7) was 2.9, 2.3, 2.7 and 2.4. (See also Columns 4, 7 and 10 of *Table 5*.)

The above exercise confirms the patterns that Whichard and Lowe (1999) identified.

Another finding from the table is that US parent companies exhibit a trade surplus in goods and services, in their intra-firm trade with foreign subsidiaries (Row 10). This is the US multinational corporations' contribution to the US balance of payments, which facilitates acceptance of their globalization strategy in the context of the country's economy. The importance of the intra-

firm trade is also demonstrated by the in-group sales ratio (Row 14), which contrasts with the deficit balances with unaffiliated companies (Row 11). This, with the fact that 25–30 per cent of parents' goods exports are destined for overseas affiliates (Row 12), makes the importance of intra-firm exports obvious.⁴

To sum up, one characteristic of Whichard and Lowe (1999) is that it includes in exports the sales by US affiliates to their overseas parents, so that both the imports and the exports of US affiliates in that direction are included. This perspective reflects the notion that globalization of multinational corporations has brought in the new historical stage, in which corporations and national economies interact in a reciprocal fashion. The paper is especially interesting because it presents estimates of the impacts of intra-firm trade. Inclusion of non-US corporate groups in the inquiry, however, means that compatibility with conventional analyses of the US economy could become an issue.

The other important study, Zeile (1997), closely examined the intra-firm trade in goods by US multinationals and foreign multinationals in the US. The first section analyses the trend of the share of intra-firm trade conducted by US and non-US multinational corporations in US exports and imports.⁵ The second discusses the intra-firm trade pattern industry by industry. Let us look at the findings on these.

Zeile's hypothesis is that intra-firm trade may help a multinational company to reduce the costs of distributing goods abroad or of acquiring inputs from abroad or to integrate production processes on a global

⁴ Total US exports were USD 21.6 billion in 1982, USD 22.7 billion in 1986, USD 39.4 billion in 1990 and USD 46.5 billion in 1993, according to *Table 1* of Zeile (1997). The shares of multinationals' intra-firm trade were therefore 21.8, 26.9, 22.9 and 23.9 per cent respectively.

⁵ Since this paper's primary concern is intra-firm trade by US multinationals, intra-firm trade of foreign parents' affiliates in the US is shown separately as memoranda items, such as FX, FM, and FOM in *Table 8*.

scale. It may, at least in the short run, be more insulated from competitive forces in particular markets or from overall changes in prices, exchange rates or general economic conditions. Furthermore, the 'transfer prices' that govern intra-firm trade may have unique characteristics and determinants. The empirical analyses cover the period 1977–94, as data for US multinational corporations and foreign multinationals became available only in 1977. The following are the highlights:

- * The intra-firm-trade shares of US exports and imports of goods changed little over the two decades.
- * The intra-firm-trade share of total trade by US parent companies increased markedly after 1982.
- * The intra-firm trade of US multinationals was mainly with their foreign manufacturing affiliates in 1992.
- * The US intra-firm trade of foreign multinationals was primarily with US wholesale affiliates. However, the share of intra-firm trade with manufacturing affiliates increased substantially after the mid-1980s.

The intra-firm-trade shares of US exports and imports of goods varied widely according to trading partners. In 1992, the share of exports was 70 per cent for Japan and 12 per cent for Taiwan. In imports for the same year, it was 71 per cent for Japan and less than 10 per cent for China and Taiwan.

To elaborate on the first point, the percentage share of intra-firm trade in US exports was 35 per cent in 1977 and 36 per cent in 1994, while intra-firm imports' share remained roughly the same, at 44 per cent in 1977 to 43 per cent in 1994. For both exports and imports, intra-firm trade mainly consisted of shipments from parents to affiliates rather than shipments to parents from affiliates. US intra-firm exports were mainly accounted for by intra-firm trade of US multinationals, *i.e.* shipments from US parent companies to foreign affiliates. The share in most years ranged from two-thirds to three-quarters. After 1982, US intra-firm

imports were mainly accounted for by shipments from foreign parents and other member firms of the foreign group to US affiliates. From 1982 to 1994, the share of US parent company exports shipped to foreign affiliates rose from 31 to 42 per cent, while the share of US parent imports sought from foreign affiliates increased from 36 to 50 per cent. These facts imply strengthened linkage between the parent and subsidiary companies.

The share of intra-firm exports of foreign multinationals in total US exports fluctuated between 7 and 12 per cent. This type of trade was dominated by Japanese-owned wholesale affiliates (particularly affiliates of Japan's largest general trading companies), handling US exports to Japan. The US intra-firm imports of foreign parents accounted for some 20 per cent or more. The share of imports increased substantially in 1984–90, from 21 to 28 per cent. As with exports, much of the US intra-firm imports of foreign multinationals were accounted for by Japanese-owned affiliates.

The intra-firm trade of US multinationals can be viewed as an aspect of the international division of manufacturing production between foreign affiliates, which constitute the parent company's world network. The intra-firm exports to these manufacturing affiliates have mainly consisted of materials and components for further processing or assembly. In contrast, the US intra-firm trade of foreign multinationals has been connected largely with distribution and marketing activities. For both exports and imports, this trade has mainly been accounted for by wholesale affiliates in the US.

As for the industrial pattern, much of the intra-firm trade with manufacturing affiliates consisted of trade with motor-vehicle affiliates. The share ranged from 38 to 48 per cent for exports and from 44 to 54 per cent for imports in 1982–94. Intra-firm trade with affiliates in machinery industries (industrial and electronic and other electric-machinery manufacturing) was also substantial in the same period, accounting for 27–32 per cent of intra-firm exports to manufacturing affiliates and 30–37 per cent

of intra-firm imports from them. The share of intra-firm exports to wholesale affiliates increased substantially in 1984–94, from 25 to 37 per cent, much of the trade being in machinery products.

The intra-firm trade of foreign multinational groups, unlike that of US multinationals, was mostly with wholesale affiliates. Their intra-firm exports largely consisted of homogeneous commodities, such as food and crude materials, shipped by affiliates of Japan's general trading companies or by French-owned affiliates specializing in farm products. By contrast, the intra-firm imports of wholesale affiliates mainly consisted of heterogeneous manufactured products, such as machinery products or road vehicles and parts. Most such affiliates were set up by foreign manufacturers to facilitate the marketing of their own products, where a local, wholesaler presence may be necessary to provide specialized after-sales service or obtain feedback on customer requirements and tastes.

The share of US affiliate intra-firm exports and imports accounted for by manufacturing affiliates increased substantially. For exports, the share increased steadily from 12 to 27 per cent in 1977–94. The shares for affiliates were particularly high in chemicals and electronic equipment: from 27 to 37 per cent for exports and 18 to 22 per cent for imports in the former case and 12–30 and 17–25 per cent in the latter.

Several other interesting points emerge. Industries consolidated on an international scale, bringing close links among national economies. This is substantiated by the globalization of US multinationals in their production processes, through integration with foreign manufacturing affiliates and the operational expansion of affiliates of foreign parents, operating in US markets. It is especially important that intra-firm trade was growing in motor vehicles, industrial machinery, electronic and electric equipment, which were characterized by state-of-the-art technology and complicated, elaborate end products. The global integration in these industries suggests that the division of labour was being promoted in processes and

in products. In addition, expansion of the equipment trade of wholesale affiliates in these industries reveals that they have moved on from their original areas of distribution and marketing to join the manufacturing affiliates in contributing to worldwide product integration. All these observations attest to the progress of product integration on a global level.

To sum up, Zeile (1997) presents a framework in which detailed analyses could be conducted in the field of contents and levels of intra-firm trade by US multinationals in the world market. This has refined our understanding of the international division of labour taking place in respective corporate groups. The paper also raised a new issue, concerning Japanese and Western European intra-firm trade as opposed to that of US companies, as well as revealing some characteristics of intra-firm trade in Mexico, Singapore, and Malaysia. Viewed from the perspectives of non-US multinationals and national economies, Zeile's analysis sheds a different light on intra-firm trade. Most US affiliates of foreign parents are wholesalers, whose imports from parents amounted to over three-quarters of the total intra-firm imports. More than 90 per cent of their imports were destined for resale. The share of intra-firm imports from parents by wholesale affiliates was 69 per cent for Japan, 52 for Germany and 62 for Sweden, which implies that US wholesale affiliates are the focus of US trade for these countries. As for intra-firm exports by US wholesale affiliates, the share of Japanese subsidiaries moved from 55 to 68 per cent of the total, followed by French affiliates. Intra-firm imports of German and Swedish affiliates were mainly in motor vehicles. As for intra-firm trade with developing countries, imports from Singapore and Malaysia were mainly of computers and electric components, reflecting an in-group international production process.

Table 9 lists the US parents' intra-firm exports to majority-owned foreign affiliates by countries of destination and by industry, *i.e.* manufacturing and wholesale. (The percentages do not add up to 100 due to the

omission of petroleum and some other industries from the table.) The overall share of intra-firm exports from manufacturing parent companies was about 65 per cent of the total. This share to Canada and Western European countries (excluding Switzerland) ranged from 50 to 70 per cent. For developing areas, manufacturing intra-firm exports were in the range of 60–90 per cent of total exports to Latin American countries (Brazil, Mexico, and Venezuela) and some Asian economies (Korea, Malaysia, Singapore, and Thailand). These facts reflect globalization in the US manufacturing sector's production processes, as well as involvement by developing economies in the intra-firm international division of labour of US corporations.

Two issues arise from these observations. (i) Affiliates of foreign multinationals in US markets are concentrated in wholesale activities. This is in a sharp contrast to US multinationals, which have succeeded in globally integrating their production processes. Here there exists a gap in the structure of the world economy that can be termed a 'multi-layered structure'. One should note, however, that expansion of Japanese FDI in the United States and Europe took place only in the 1980s, which may call for revisions of this structural-gap approach. It is nonetheless important to pay close attention to country-specific differences when analysing the operation of multinationals. (ii) The dependence of developing economies on US corporations and their intra-firm trade may produce trade patterns inconsistent with comparative-advantage theory. It is vitally important to analyse the intra-firm division of labour and intra-firm trade, in view of their potential impacts on trade structure.

5. CONCLUDING REMARKS

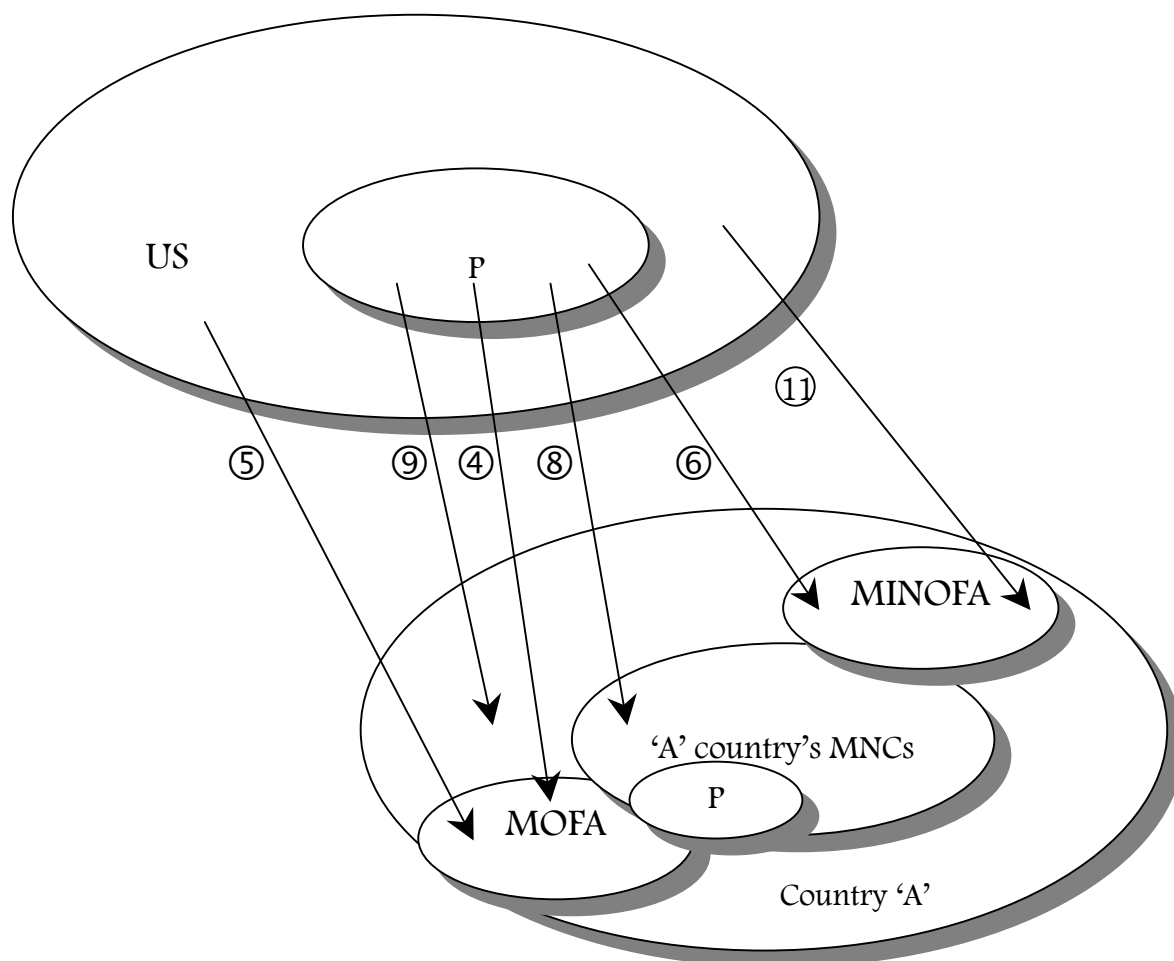
The development of multinational corporations since the 1960s has changed the structure of the world economy, including international markets. This naturally affects trade theory, which is central to analysing

the international economy. This paper has discussed the association of these by examining data that demonstrate the status of intra-firm trade by multinationals. They administer intra-firm international trade, from a global perspective, to procure materials for production efficiently and distribute intermediate and final goods. Trade patterns that result from intra-firm transactions are no longer dictated by factor endowments and comparative advantages.

The theory of internalization, in the 1970s, modelled exports in a context of a choice of technology transfer and direct investment. In this theory, there was already a concept to perceive exports (and hence trade) as a dynamic decision for companies, rather than something explained by objective factors, such as differences in the resource endowments and product competitiveness of different countries. The stagnation in the development of trade theory in past decades is due to the fact that economists have overlooked the historic change in the structure of the world economy brought about by the development of multinationals and intra-firm trade.

A similar weakness lies in location theory. Economists should have transformed their viewpoint, from the given factor endowments, to one allowing for the strategic choice of location by companies, since multinationals now have alternatives of shipping from their overseas affiliates in addition to exporting from host economies.

Figure 1
The conceptual framework for the data in Table 4



Note: P = parent corporations, MOFA = majority-owned foreign affiliates, and MINOFA = minority-owned foreign affiliates. Arrows starting from non-P denote shipments from non-MNCs in the United States.

Table 1
GDP and revenues, 1998, USD 100 mn

Rank	Countries and companies	GNP or revenues	Rank	Countries and companies	GNP or revenues
1	United States	79030	51	<i>Intl. Business Machines (US)</i>	817
2	Japan	40891	52	Malaysia	813
3	Germany	21798	53	Egypt	792
4	France	14654	54	Philippines	789
5	United Kingdom	12643	55	<i>AXA (France)</i>	787
6	Italy	11570	56	<i>Citigroup (US)</i>	764
7	China	10818	57	<i>Volkswagen (Germany)</i>	763
	Hong Kong	1582	58	<i>Nippon Telegraph & Telephone (Japan)</i>	761
8	Brazil	7676	59	Chile	739
9	Canada	5809	60	Ireland	693
10	Spain	5552	61	<i>BP Amoco (Britain)</i>	683
11	India	4274	62	<i>Nissho Iwai (Japan)</i>	677
12	Korea Republic	3988	63	<i>Nippan Life Insurance (Japan)</i>	663
13	Netherlands	3891	64	<i>Siemens (Germany)</i>	660
14	Australia	3870	65	<i>Allianz (Germany)</i>	649
15	Mexico	3681	66	<i>Hitachi (Japan)</i>	624
16	Russian Federation	3318	67	Pakistan	615
17	Argentina	2903	68	Peru	605
18	Switzerland	2841	69	<i>US Postal Service (US)</i>	601
19	Belgium	2590	70	<i>Matsushita Electric Industrial (Japan)</i>	598
20	Sweden	2265	71	<i>Philip Morris (US)</i>	578
21	Austria	2167	72	<i>ING Group (Netherlands)</i>	565
22	Turkey	2005	73	<i>Boeing (US)</i>	562
23	Denmark	1752	74	New Zealand	554
24	<i>General Motors (US)</i>	1613	75	<i>AT&T (US)</i>	536
25	<i>Daimler-Chrysler (Germany)</i>	1546	76	<i>Sony (Japan)</i>	532
26	<i>Ford Motor (US)</i>	1544	77	Czech Republic	530
27	Norway	1520	78	<i>Metro (Germany)</i>	521
28	Poland	1513	79	<i>Nissan Motor (Japan)</i>	515
29	Saudi Arabia	1434	80	<i>FIAT (Italy)</i>	510
30	<i>Wal-Mart Stores (US)</i>	1392	81	<i>Bank of America (US)</i>	508
31	South Africa	1369	82	<i>Nestle (Switzerland)</i>	495
32	Thailand	1319	83	Ukraine	492
33	Indonesia	1306	84	<i>Credit Suisse (Switzerland)</i>	491
34	Finland	1251	85	<i>Honda Motor (Japan)</i>	487
35	Greek	1234	86	United Arab Emirates	487
36	<i>Mitsui (Japan)</i>	1094	87	<i>Assicurazioni Generali (Italy)</i>	483
37	<i>Itochu (Japan)</i>	1087	88	<i>Mobil (US)</i>	477
38	<i>Mitsubishi (Japan)</i>	1072	89	<i>Hewlett-Packard (US)</i>	471
39	Portugal	1064	90	Algeria	464
40	Iran	1022	91	Hungary	457
41	<i>Exxon (US)</i>	1007	92	<i>Deutsche Bank (Germany)</i>	452
42	Columbia	1007	93	<i>Unilever (Britain/Netherlands)</i>	449
43	<i>General Electric (US)</i>	1005	94	<i>State Farm Insurance (US)</i>	446
44	<i>Toyota Motor (Japan)</i>	997	95	<i>Dai-Ichi Life Insurance (Japan)</i>	445
45	Israel	965	96	Bangladesh	442
46	Singapore	955	97	<i>VEBA Group (Germany)</i>	434
47	<i>Royal Dutch/Shell Group (Britain/Netherlands)</i>	937	98	<i>HSBC Holdings (Britain)</i>	433
48	<i>Marubeni (Japan)</i>	926	99	<i>Toshiba (Japan)</i>	415
49	<i>Sumitomo (Japan)</i>	890	100	<i>Renault (France)</i>	414
50	Venezuela	821			

Sources: GNP from World Bank (2000), revenues from *Fortune* (1999).

Table 2
Global networks of US multinationals by industry and industry of parent, 1997

	No. of parents	No. of affiliates	No. of affiliates per parent
	(1)	(2)	(2)/(1)
<i>All industries</i>	<i>2,618</i>	<i>22,871</i>	<i>8.7</i>
Petroleum	97	1,796	18.5
Manufacturing	1,501	14,087	9.4
Food and kindred products	69	1,097	15.9
Chemicals and allied products	205	3,330	16.2
Primary and fabricated metals	188	977	5.2
Industrial machinery and equipment	260	2,480	9.5
Electronic and other electric equipment	209	1,663	8.0
Transportation equipment	79	1,269	16.1
Other manufacturing	491	3,271	6.7
Wholesale trade	265	1,541	5.8
Finance, Insurance, Real estate	217	1,592	7.3
Services	280	2,009	7.2

Source: US DC (1999), Table A II.

Table 3
Number of US affiliates per investment-destination country, 1997

Country	Number of affiliates		Country	Number of affiliates
<i>All countries</i>	<i>22,871</i>		Bermuda	330
			Netherlands Antilles	78
<i>Canada</i>	<i>2,073</i>		UK Caribbean islands	175
<i>Europe</i>	<i>11,209</i>		<i>Africa</i>	<i>559</i>
France	1,297		South Africa	160
Germany	1,424			
Netherlands	1,104		<i>Middle East</i>	<i>355</i>
Italy	783			
United Kingdom	2,532		<i>Asia and Pacific</i>	<i>4,977</i>
Czech	88		Australia	904
Hungary	101		China	350
Poland	105		Hong Kong	574
Russia	103		Indonesia	187
			Japan	990
<i>Latin America, etc.</i>	<i>3,583</i>		Korea, Republic of	229
Brazil	461		Malaysia	220
Venezuela	219		Singapore	490
Mexico	874		Taiwan	237
Panama	112		Thailand	212

Source: US DC (1999), Table A I.

Table 4
US exports of goods associated with US parents and foreign affiliates, by industry of parent, USD billions

	Shipped to affiliates as reported on affiliates' form						Shipped to other foreigners by US parents			Addendum – US exports shipped by US parents to all affiliates as reported on parent's forms	Addendum – shipment by unaffiliated US to minority-owned foreign affiliates (2 –10)	Addendum – parents shipment (7 + 10)	Addendum – shipment ratio of US parents to all their affiliates (10/12)
	Total (= col- umns 2 + 7)	To all affiliates	To majority-owned affiliates			To other affiliates	Total	To for- eign parent groups	Other				
			Total	By US Parents	By unaffili- ated US								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>All industries</i>	434	216	209	181	27	7	218	21	198	183	33	401	45.6
Petroleum	15	6	6	5	1	0	9	1	8	5	1	14	35.7
Manufacturing	364	194	188	166	22	6	170	11	158	167	27	337	49.6
Food and kindred pr.	20	6	5	5	1	0	14	0	14	5	0	19	26.3
Chemicals and allied pr.	42	25	23	22	2	1	17	3	14	22	3	39	56.4
Primary and fabr. metals	11	3	3	2	1	0	8	0	8	3	1	11	27.3
Ind. machinery and equ.	65	43	43	40	3	0	22	1	21	40	3	62	64.5
Computer and office equ.	36	33	33	31	2	0	4	D	D	31	2	35	88.6
Electronic, electric equ.	69	35	35	32	2	1	34	4	30	32	3	66	48.5
Electronic comp., acc.	36	22	D	19	D	D	14	D	D	19	3	33	57.6
Transport equipment	112	-	-	-	-	-	-	-	-	-	-	-	-
Motor vehicles and equ.	72	59	59	45	11	2	13	D	D	46	13	59	78.0
Other manufacturing	44	-	-	-	-	-	-	-	-	-	-	-	-
Paper and allied products	12	4	3	3	0	1	8	0	8	3	1	11	27.3
Instruments and related	16	9	9	8	1	0	7	0	6	8	1	15	53.3
Wholesale trade	38	9	9	7	2	0	29	8	21	7	2	36	19.4
Durable goods	19	6	6	5	1	0	13	D	D	5	1	18	27.8

Source: US DC (1999), Table A II.1.

Notes: (-) shows that the data were committed. (D) indicates that the data in the cell were suppressed to avoid disclosure of data of individual companies. Columns (11), (12) and (13) are the author's own calculations.

Table 5
Sales by affiliates, by industry of US parent and destination, USD billions

	Sales to both destinations			Sales to the US			Sales to other foreign countries			Local addendum			Addendum: Ratio of sales to other foreign affiliates (8/7)
	Total	To affiliates	To unaffiliated	Total	To parents	To unaffiliated	Total	To other foreign affiliates	To unaffiliated	Total	To other foreign affiliates	To unaffiliated	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
<i>All industries</i>	687	458	229	202	172	29	486	286	200	1296	78	1218	58.8
Petroleum	71	38	33	27	20	7	45	18	26	195	24	171	40.0
Manufacturing	498	365	133	147	133	14	351	232	119	769	44	725	66.1
Food and kindred products	26	12	14	3	2	1	23	10	13	83	4	79	43.5
Chemicals and allied products	90	65	25	13	11	1	78	54	24	158	8	150	69.2
Drugs	41	35	6	6	6	0	34	29	6	63	4	59	85.3
Primary and fabricated metals	15	5	10	5	3	2	10	2	8	25	2	23	20.0
Industrial machinery and equ.	140	114	26	33	32	2	105	82	24	156	11	144	78.1
Computer and office equipment	105	97	8	26	25	0	80	72	8	115	9	105	90.0
Electronic and electrical equ.	57	36	21	18	17	2	38	19	19	95	4	91	50.0
Audio, video, comm. equ.	12	8	4	5	5	0	7	3	4	23	1	22	42.9
Electronic components and acc.	32	20	12	11	10	1	22	10	11	53	2	50	45.5
Transportation equipment	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor vehicles and equipment	110	101	9	60	58	2	49	43	7	126	9	117	87.8
Other manufacturing	-	-	-	-	-	-	-	-	-	-	-	-	-
Textile products and equipment	3	2	1	1	0	0	3	2	1	5	0	5	66.7
Paper and allied products	12	6	6	3	2	2	8	4	4	26	1	25	50.0
Instruments and related prod.	20	13	7	3	3	0	16	10	7	32	1	31	62.5
Wholesale	50	24	26	12	9	3	38	15	23	86	5	81	39.5

Source: US DC (1999), Table III F9.

Notes: The figures include USD 272.9 billion in service sales, USD 45.7 billion in investment income, other than sales of goods. The figures do not include those of MINOFA. The figures are from sales data, not export data.

Table 6
US exports of goods to affiliates, by industry of affiliate, shipper and intended use, USD billion

	Shipped by all US					Shipped by US parents					Shipped by unaffiliated US				
	Total	Capital equipment	For resale	For further manufacture	Other	Total	Capital equipment	For resale	For further manufacture	Other	Total	Capital equipment	For resale	For further manufacture	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
<i>All industries</i>	153	3	62	88	0	133	2	59	72	0	21	1	3	16	0
Petroleum	2	1	1	0	0	2	0	1	0	0	1	0	0	0	0
Manufacturing	100	1	14	85	0	84	1	14	69	0	17	1	0	16	0
Food and kindred products	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0
Chemicals and allied products	11	0	2	9	0	9	0	1	8	0	2	0	0	1	0
Drugs	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0
Primary and fabricated metals	2	0	0	2	0	2	0	D	1	0	1	0	0	1	0
Industrial machinery and equipment	15	0	2	13	0	13	0	2	11	0	2	0	0	2	0
Electronic and other electric equipment	15	0	1	14	0	14	0	1	14	0	1	0	0	1	0
Electronic components and accessories	9	0	0	9	0	9	D	0	8	D	1	D	0	0	0
Household audio, video, comm. equ.	4	D	D	3	0	4	0	0	4	0	0	0	0	0	0
Transportation equipment	44	D	D	35	0	34	D	D	25	D	10	D	D	9	0
Other Manufacturing	11	D	D	9	0	9	D	D	8	0	2	D	D	2	0
Rubber products	1	D	D	1	0	1	D	D	1	0	0	0	D	0	0
Instruments and related products	5	0	1	3	0	4	0	1	3	0	0	0	0	0	0
Wholesale	46	0	44	2	0	44	0	42	2	0	2	0	2	0	0

Source: US DC (1998), Table III. I. The table only concerns MOFA.

Table 7
Exports to affiliates of goods for further manufacture, by industry of affiliate and shipper

	Total (4/1)	Shipped by US par- ents (9/6)	Shipped by unaffili- ated US (14/11)
	(1)	(2)	(3)
<i>All industries</i>	57.1	54.0	76.7
Petroleum	19.4	22.4	9.3
Manufacturing	84.6	82.8	93.7
Food and kindred products	91.4	92.4	97.6
Chemicals and allied products	83.8	83.2	87.3
Drugs	87.2	85.5	96.4
Primary and fabricated metals	89.6	91.2	86.2
Industrial machinery and equipment	88.3	87.0	98.0
Electronic and other electrical equ.	94.2	95.3	74.1
Electronic components and acc.	95.2	96.6	75.2
Household audio, video, comm. equ.	99.9	99.9	100.0
Transportation equipment	79.6	88.5	96.9
Other manufacturing	84.5	83.2	91.7
Rubber products	69.6	64.5	97.6
Instruments and related products	74.8	74.4	79.0
Wholesale trade	4.2	4.1	6.1

Note: The numbers in parentheses refer to Table 6.

Table 8
Ownership-based disaggregation of the US current accounts, 1982–93, USD billion

	1982	1986	1990	1993
1 Cross-border exports of goods and services, total	248.7	285.0	494.9	590.9
1a Goods	186.2	201.4	351.5	409.6
1b Services	62.6	83.5	143.3	181.2
2 To affiliated foreigners intra-firm exports	55.4	72.7	112.5	138.4
2a Goods	47.1	61.1	90.1	111.1
2b Services	8.3	11.6	22.4	27.4
3 To unaffiliated foreigners	193.3	212.3	382.4	452.4
3a Goods	139.0	140.4	261.5	298.6
4 Foreign affiliates' purchase of goods and services from the US	65.0	82.6	128.8	156.4
5 Sales by foreign affiliates to other foreign affiliates of the same parent	123.4	135.1	233.9	257.7
FX Exports to foreign parent (groups) of US affiliates	26.5	24.9	42.2	53.7
6 Cross-border imports of goods and services, total	246.0	353.7	437.9	562.7
6a Goods	195.7	275.0	360.8	440.9
6b Services	50.3	78.7	113.0	121.8
7 From foreign affiliates of US companies, intra-firm imports	42.1	57.5	85.9	108.8
7a Goods	39.3	55.0	80.3	102.9
7b Services	2.8	2.5	5.6	5.9
8 From unaffiliated foreigners	204.0	296.2	388.0	453.9
FM From foreign parent (groups) of US affiliates	53.4	95.7	143.2	156.7
FOM US affiliates' purchase of goods and services from abroad	85.7	128.1	188.7	206.6
9 Balance on goods and services (1 - 6)	2.7	-68.7	21.0	28.2
9a Goods (1a - 6a)	-9.5	73.6	-9.3	-31.3
9b Services (1b - 6b)	12.3	4.8	30.3	59.4
10 Balance on US parents' goods and services trade with their affiliates (2 - 7)	13.3	15.2	26.6	29.6
10a Goods (2a - 7a)	7.8	6.1	9.8	8.2
10b Services (2b - 7b)	5.5	9.1	16.8	21.5
11 Balance on US parents' goods and services trade with unaffiliated compa- nies (3 - 8)	-10.7	-83.9	-5.6	-1.5
12 US parents' goods exports ratio to their affiliated foreigners (2a/2a + 3a)	25.3%	30.3%	25.6%	27.1%
13 Ratio of foreign affiliates' imports from their parents in total imports from the US (2/2 + 4)	46%	46.8%	46.6%	46.9%
14 Magnifications of intra-firm sales, except local sales by affiliates, to imports from their parents (5 + 7)/2)	3	2.6	2.8	1.9

Sources: Whichard and Lowe (1999); International Direct Investment, Bureau of Economic Analysis, U.S. Department of Commerce, March 1999. Made from Table 1.

Table 9
 Intra-firm trade in goods between US parents
 and their majority-owned foreign affiliates,
 by destination country and industry of affiliate, 1992, %

	Manufacturing	Wholesale
<i>All countries</i>	<i>64.8</i>	<i>31.3</i>
Canada	83.2	15.6
Germany	67.6	30.1
Netherlands	47.9	43.9
Switzerland	7.3	91.4
United Kingdom	57.9	31.3
Brazil	96.5	1.7
Mexico	92.5	6.7
Venezuela	77.9	18.9
Hong Kong	21.2	76.5
Japan	31.7	64.9
Korea, Republic of	64.3	32.6
Malaysia	80.5	19.5
Singapore	61.6	36.1
Taiwan	48.7	49.1
Thailand	69.5	28.4

Source: Zeile (1997), Table 7.

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EFFECTS OF MULTINATIONAL CORPORATIONS ON FOREIGN TRADE. THE EXAMPLE OF HUNGARY

1) THEORETICAL INTRODUCTION

Early theories of FDI and multinational firms saw FDI and foreign trade as substitutes for one another. Mundell (1957) built a model in which both FDI and foreign trade are based on the price differences of products and production factors, determined by the different factor endowments of the countries. The product-cycle theory of Vernon (1966) was also based on the same substitution principle: FDI replaces exports as the product matures.

Kojima (1975) retained the traditional comparative advantage theory when introducing the concept of trade-oriented (pro-trade) and anti-trade-oriented FDI, based on the theory of comparative advantages. According to this, FDI can be called *trade-creating or pro-trade* if the investment is undertaken from the home country's comparatively disadvantaged industries into the host country's comparatively advantaged industries. Then both countries gain from the ensuing trade creation. With anti-trade FDI, investment flows from a firm in a home country's comparatively advantaged industry into a host country's comparatively disadvantaged industry. In this way, the home country has an excess demand for importable goods and an excess supply of exportable goods. The two countries compete in importing and exporting capacities, so that FDI can even destroy trade.

At the end of the 1970s, there began to be emphasis in 'new international trade' theories on a complementary relationship between FDI and foreign trade. (See Krugman, 1990 and 1991, and Venables, 1996, for example.) This results from introducing into the models new aspects such as increasing returns of scale, product differentiation and technology differences between

nations. Allowing for these and assuming identical relative factor endowments, Markusen (1983) proved that factor (capital) movements between two economies lead to an increase in the volume of trade.

Depending on the circumstances, therefore, FDI and multinational investments can have trade-substituting or trade-creating effects. Two distinct types of investor can be distinguished in terms of strategy: the export-oriented investor and the market-oriented investor.⁶ (The subtypes of these two groups are described by Dunning, 1993.)⁷ *Export-oriented* investment aims to exploit the low-cost resources, relative factor abundance, institutional structure, economic policy, *etc.* of the host market and to concentrate the supply to export markets on a few locations.

Market-oriented investors invest in a country or region to supply its markets with their goods or services. They may be prompted to do so by expansion of that market or by economic policy changes in the target country. The aim of the investment is to preserve or gain market shares. The products made by the affiliate are sold in the local or regional market.

The effect on foreign trade depends on whether the investment is oriented towards exports (a trade-creating effect) or towards the domestic market (a trade-creating or a substitutive effect). These two kinds of investment have different effects on the host country's balance of trade. Export-oriented investments may improve the trade balance, even if case studies show that many firms tend to import most of their inputs initially. Market-oriented firms, on the other hand,

⁶ The final objective of both types is the same: to sell as much as possible.

⁷ He calls these groups as efficiency seekers, resource seekers, market seekers and strategic-asset seekers.

may worsen the trade balance, if their exports are negligible and many of their inputs are imported. In principle, the *size of the host country* is likely to influence the trade strategy of foreign investors. Thus, big countries tend to be more suitable for market-oriented companies, while small host countries appear to be more suitable for export-oriented FDI because, apart from having a small domestic market, they usually have a higher degree of openness (ratio of trade to GDP) than large countries.

In either event, the impact on the net trade balance of the host country may differ depending on the trade strategy of the FDI. The bulk of the studies support the conclusion that foreign-investment firms are more export-intensive and more import-intensive than domestic firms. Dunning (1993) argues that they are likely to be more trade-oriented than national companies, partly because foreign production cannot occur without some trade in intermediate products.

2) HUNGARY'S EXPERIENCE IN THE 1990S

Hungary proved an especially attractive destination for foreign investment in Central Europe in the 1990s. Annual inflows of FDI were generally about 4 per cent of GDP and 22 per cent of gross fixed capital formation. By the end of 2000, Hungary's FDI stock per capita was around USD 2000, which was the highest in the region. The stock of FDI in 1999 was a very high 40 per cent in relation to GDP.

Hungary has attracted significant amounts of greenfield investment by multinationals, compared with other countries in the region. This was partly due to special government incentives. Act XXIV/1988 on foreign investment was very important in enabling companies with foreign participation to create industrial customs-free zones under the control of the customs authorities, within which they were regarded as foreigners for the purposes of exchange con-

trols and foreign trade. Corporate accounts in the zone can be kept in foreign currencies, but are subject to Hungarian taxation, with the exception of VAT. These zones have proved especially attractive to foreign firms exporting significant quantities of finished or semi-finished goods made from imported raw materials and components. Today, there are about 110 industrial customs-free zones in various parts of Hungary, the majority of which belong to the engineering industry. Most of the ventures in the zones are 100% foreign-owned greenfield investments by multinationals. They produce an increasing foreign-trade surplus: USD 318 million in 1996 and USD 2091 million in 1999. The importance of the industrial customs-free zones is indicated by the fact that they accounted for 45 per cent of Hungary's exports and 32 per cent of its imports in 2000. As for the product composition of the customs-free trade, almost 100% of the exports come from SITC Group 7 (machinery and transport equipment).

The production and exporting activity of multinationals have brought about big changes in Hungary's export structure. *Table 10* concentrates on the country's most important trade relation, with the EU, grouping the manufacturing sectors according to technology level, to show the extent of these changes.⁸

The most remarkable phenomenon is the rapid increase in the high-technology sectors of manufacturing exports, whose share more than tripled over seven years, to reach 34 per cent in 1998. This trend is due to three sub-sectors – electrical machinery, telecommunications equipment and office

⁸ The industry classification is based on the OECD (1993) method set out in the ISIC classification (International Standard Industrial Classification of All Economic Activities). The indicator of technological intensity (weighted according to sectors and countries) is the share of R and D expenditures in production or value added. Before aggregation to ISIC, all calculations were made by referring to foreign trade at the SITC (Standard International Trade Classification) 5-digit product level given by the Eurostat Comext database. Here the EU is the reporter country, so that 'Hungarian exports to the EU' means EU imports from Hungary.

machinery – where multinational affiliates are exporting actively. Medium-technology sectors also increased their share, for which the motor-vehicle industry was entirely responsible. The share of low-technology sectors rapidly decreased, mainly due to shrinkage of the food and beverage, textile and clothing, and basic metal industries.⁹ (These results are in line with those of Eichengreen and Kohl (1988), who found that of the CEE countries, Hungary displayed huge increases in R and D, capital and skill-intensive sectors and corresponding drops in low R and D and low skill-intensive sectors.) Török and Petz (1999) constructed an econometric model to prove the explanatory role of R and D intensity in shaping change and development in the export structure.

When total Hungarian-EU trade is examined at SITC 5-digit product level, it turns out that the top ten product groups were responsible for 42.8 per cent of the total exports to the EU in 1999, which was a considerable share increase over 1990 (*Table 11*). In the meantime, the structure of the top ten had changed completely. Footwear, the leading export product in 1990, and agricultural and other non-machinery products had vanished from the list. The top product group in 1999, with by far the largest, 13.6 per cent share, was ‘reciprocating piston engines for cars of a cylinder capacity exceeding 1000 cc’. Computer-storage units and video recording apparatus, in third and fourth places, are high-tech products, as are several other products in the top ten: telecommunications equipment, storage units for automatic data processing, and electrical machinery products. These are produced by a small number of multinational affiliates (belonging to IBM, Philips and GE, and operating mainly in customs-free zones).

Since the top ten products account for a large and increasing share in exports at such a detailed product level, concentration can be called an important characteristic of Hungarian exports to the EU. This is confirmed by statistical calculations on concen-

tration. Values for the Herfindahl-Hirschmann index¹⁰ increased significantly between 1990 and 1999. (In 1990, it was 0.068, in 1993, 0.077, and in 1999, 0.180¹¹.) As the product structure shows, the increasing concentration of exports was caused by the activity and export growth of multinationals in certain branches. Other branches did not manifest so rapid a rate of increase and their weight in total exports has fallen.

On the import side, imports of machinery and consumer goods increased considerably during the 1990s. Looking at the technology structure, imports of high-tech products took up 23.4 per cent of total imports from the EU, which was a smaller share (and a smaller absolute amount by value) than high-tech exports. Thus Hungary has a net trade surplus with the EU in high-tech products.

In view of the important role played by multinationals in trade, it can be presumed that intra-industry and intra-firm trade between Hungary and the EU likewise increased in the 1990s.

3) INTRA-INDUSTRY TRADE

Intra-industry trade is characteristic for sophisticated manufactured products. This type of trade is explained by monopolies, increasing returns from scale, and homogeneous consumer preferences in partner countries. Intra-industry trade (IIT) is especially intensive among developed countries, which trade in similar, diversified manufactured products. It may constitute the exchange of the same goods with different packing or seasonal effects, the exchange of differentiated or substitutive goods, or the outcome of intra-industrial cooperation. The more similar the factor endowments of the

⁹ The decrease refers to the share. The absolute value of low-tech exports has increased.

¹⁰ $HHI = [\sum_i s_i^2]^{1/2}$, where s_i is the share of the product group in total exports. The index varies between $1/n^{1/2}$ and 1 (full concentration).

¹¹ Own calculations based on Eurostat Comext.

partner countries are, the greater the extent of IIT. It should be mentioned that IIT trade is often mixed with trade within the vertical production structure. For instance, if a country imports motors and exports cars, that is not IIT, although at a high enough aggregation level, both products belong to the 'vehicles and components' category. Appropriate disaggregation is important when measuring IIT. It should be clarified that intra-firm trade – between a multinational parent and its affiliates – may be, but is not necessarily intra-industrial. Intra-firm trade is not part of IIT or vice versa. (Fontagné *et al.*, 1995). FDI can have a marked impact on IIT and intra-firm trade.

The Grubel-Lloyd Index (Grubel and Lloyd, 1975) is the basic indicator used to analyse IIT. However, since the work of Greenaway and Milner (1994) two types of IIT are distinguished: vertical, when the products traded are of the same type but different in quality, and horizontal, when the quality of the products is very similar. Definition of the types (quality judgement) is made by calculating the export and import unit values. Distinguishing vertical and horizontal IIT is important from several points of view. Integration between countries at different development levels can enhance vertical IIT. Products of the less developed country, which are of lower quality, may be crowded out by better quality imports from a more developed country, so that the costs of adjustment may be high. On the theoretical side, empirical verification of the role of economies of scale in creating IIT has remained poor. Calculations have shown that vertical IIT is usually much more significant than horizontal IIT, and interest has therefore focused on analysing and explaining the former.

The definition of the Grubel-Lloyd index for a given product group i is the following:

$$Bi = 1 - ((Xi - Mi)/(Xi + Mi)) * 100$$

The index for the whole economy (or a sector group) is the weighted average of the product group indices according to the weight of the product groups in foreign

trade (Wi). X and M are exports and imports respectively:

$$Bi_w = \sum Wi Bi \text{ where} \\ Wi = (Xi + Mi) / \sum (Xi + Mi)$$

The value of the index may range between 0 and 100, a higher index meaning a higher level of IIT. Note that the less detailed the aggregation used, the higher the value obtained for the index.

Distinguishing between horizontal IIT and vertical IIT, based on unit value of exports, proxies the quality differences of exports and imports.¹² If export and import unit value differ by less than 15 per cent, the IIT is horizontal (the traded goods are of the same quality). If the difference is greater in the direction of export unit values, the IIT is high quality vertical. Otherwise it is low-quality vertical.¹³

Differentiation of vertical and horizontal IIT in Hungary's case is reported in Éltető [2000]. The results are then grouped according to the technology-intensity levels already used. Observing the trends of IIT in Hungarian-EU trade (*Table 3*), it can be confirmed that IIT increased in almost every industry between 1990 and 1998. With the whole manufacturing sector, the growth has mainly been in horizontal and vertical high-quality IIT. The dominance of the vertical type in Hungary is in line with international experience. Of the high-technology groups, a decrease can be observed in pharmaceuticals (mainly in vertical low quality IIT), but in office machinery, telecommunications equipment and electronic machinery, a significant increase is manifest in horizontal IIT. With medical and precision instruments, there has been an increase in low-quality vertical IIT.

In the case of low-technology sectors, there is generally an increase in IIT (although from a low level). In several cases,

¹² The 'bigger price, bigger quality' principle can be criticized – for instance products may be overpriced – but no better way of denoting quality differences has emerged.

¹³ If $0.85 \leq UV_x/UV_m \leq 1.15$, then the IIT is horizontal.

this means an increase in horizontal or vertical high-quality vertical IIT (textile, paper, metals), which suggests a quality upgrading. The situation is the same in medium-technology sectors. The increase in vertical high-quality IIT is especially strong in transport equipment (except railway locomotives). Presumably, the IIT increase in these sectors is mainly due to multinational affiliates.

4) CONCLUSIONS

By the end of the 1990s, Hungary had become a production and export base for several multinational corporations. Favourable economic policy and macroeconomic conditions in the early years of the decade led multinationals to realize big greenfield investments in scale and technology-intensive industries such as automobiles, office machinery, telecommunications and electrical

machinery. Based on the experience of the conditions and the available skilled labour force, investments continued later, with new factories and extensions of existing ones.

These investments had a big impact on the competitiveness of Hungary's exports. The share of high and medium-tech products increased rapidly, with a parallel decrease in the share of low-tech products. As a result, Hungary was showing clear specialization in high-tech products by the end of the decade. The share of intra-industry trade with the EU increased, mainly induced by the intra-firm trade of multinational corporations. Looking to the new investments and promises in the near future, it can be said that the concentration of production and exports on high-tech goods in electronics and car-industry products is likely to continue. It seems that the impetus for the Hungarian industrial sectors to catch up has come from inclusion in the globalizing world economy, via alliances with multinational enterprises.

Table 10
Share of industries in Hungarian manufacturing exports to the EU, %

Sectors	1990	1993	1996	1997	1998	1999
<i>High Technology</i>	<i>9.73</i>	<i>16.26</i>	<i>25.84</i>	<i>32.57</i>	<i>34.54</i>	<i>34.14</i>
Pharmaceuticals	0.37	0.29	0.12	0.11	0.08	0.08
Office machinery	0.18	0.90	3.22	6.99	9.22	9.35
Radio, TV sets	1.47	2.02	6.56	9.81	10.97	10.04
Electrical machinery and appliances	7.05	11.74	14.74	14.48	13.01	13.22
Aircraft, spacecraft	0.04	0.18	0.03	0.02	0.03	0.02
Medical, precision, optical instruments	0.62	1.14	1.17	1.16	1.23	1.43
<i>Medium technology</i>	<i>23.52</i>	<i>24.62</i>	<i>32.92</i>	<i>34.66</i>	<i>37.12</i>	<i>42.30</i>
Organic, inorganic basic chemicals	7.55	5.36	4.01	3.50	2.65	2.34
Manufacture of rubber products	1.42	1.31	1.25	1.17	1.20	1.20
Manufacture of plastic products	0.45	0.84	0.90	0.95	0.81	0.92
Non-ferrous metals. aluminium	3.74	2.37	2.77	2.68	2.00	1.92
Machinery and equipment	7.94	7.01	5.92	5.41	5.26	4.97
Railway and tramway locomotives	0.02	0.14	0.22	0.24	0.37	0.46
Motor vehicles, trailers	1.25	5.21	16.30	19.51	23.71	29.32
Manufacture of bicycles and motorcycles	0.01	0.04	0.08	0.05	0.05	0.06
Manufacture of transport equipment n.e.c.	0.00	0.00	0.01	0.01	0.01	0.01
Other manufacturing industries	0.69	0.89	0.66	0.60	0.52	0.58
Chemical products except pharmaceuticals	0.44	1.44	0.80	0.56	0.54	0.53
<i>Low Technology</i>	<i>66.75</i>	<i>59.12</i>	<i>41.24</i>	<i>32.76</i>	<i>28.34</i>	<i>23.56</i>
Food, beverages, tobacco	19.94	13.96	8.53	6.21	4.77	4.81
Textile, clothing, leather	24.79	27.22	16.42	13.54	11.68	7.29
Wood and wood products	4.83	4.68	3.89	3.26	3.22	3.07
Paper and printing	1.26	1.18	1.01	1.05	0.96	0.93
Manufacture of refined petroleum products	2.53	1.59	2.50	1.53	1.16	1.36
Coal and petroleum products	0.51	0.25	0.11	0.07	0.03	0.03
Other non-metallic minerals	2.37	2.90	1.81	1.51	1.40	1.47
Manufacture of basic metals	6.88	2.27	2.85	2.02	2.04	1.44
Fabricated metals	3.48	4.65	4.11	3.54	3.07	3.15
Building and repairing of pleasure and sporting boats	0.16	0.43	0.02	0.03	0.01	0.02
<i>Manufacturing</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: Own calculations from Eurostat Comext database.

Table 11
Hungary's top ten export products to the EU

1990		1999	
<i>SITC number</i>	Share of total, %	<i>SITC number</i>	Share of total, %
<i>85148</i>	1.78	<i>71322</i>	13.62
<i>00121</i>	1.72	<i>78120</i>	7.40
<i>01291</i>	1.49	<i>75270</i>	5.22
<i>85190</i>	1.33	<i>75260</i>	3.15
<i>01235</i>	1.32	<i>77313</i>	2.87
<i>01233</i>	1.18	<i>76381</i>	2.86
<i>77821</i>	1.12	<i>76110</i>	2.68
<i>84230</i>	1.08	<i>78439</i>	2.50
<i>01232</i>	1.07	<i>71323</i>	1.59
<i>77521</i>	1.04	<i>77821</i>	0.94
<i>SUM</i>	<i>13.17</i>	<i>SUM</i>	<i>42.82</i>

Note: SITC numbers: 00121: sheep, live, 01232: poultry, not cut in pieces, frozen, 01233: fatty livers of geese, 01235: poultry cuts, frozen, 01291: meat of rabbits, hares, fresh or frozen, 71322: reciprocating piston engines of a cylinder capacity exceeding 1000 CC, 71323: compression-ignition engines (diesel or semi diesel) for road vehicles 75260: input/output units in data processing 75270: storage units for data processing 75997: parts of automatic data processing machines, magnetic or optical readers 76110: television receivers, colour or sound and video recorders, 76381: video recording or reproducing apparatus 76499: parts of sound recorders and TV image and sound recorders or reproducers, 77313: ignition and other wiring sets used in vehicles, 77521: refrigerators, household type 77821: filament lamps, 78120: motor vehicles for the transport of persons, 78439: parts and accessories for motor vehicles 84230: women's jacket of woven textile, 85148: footwear of leather, 85190: parts of footwear

Source: Eurostat Comext

Table 12
Intra-industry trade between Hungary and the EU, 1990 and 1998

Sectors	IIT		Horizontal		Vert. low		Vert. high	
	1990	1998	1990	1998	1990	1998	1990	1998
<i>High technology</i>								
Pharmaceuticals	43.0	28.8	0.5	1.1	27.6	12.9	14.9	14.8
Office machinery	13.1	46.5	0.9	33.9	10.1	11.4	2.1	1.2
Radio, TV sets	32.6	34.8	1.3	12.9	26.8	16.6	4.5	5.3
Electrical machinery and app.	38.4	53.3	8.0	17.4	28.0	26.3	2.4	9.6
Aircraft, spacecraft	60.0	13.0	0.0	0.2	3.5	12.5	56.5	0.3
Medical, precision, optical instr.	25.1	44.9	0.9	2.7	18.3	35.7	5.9	6.5
<i>Medium technology</i>								
Organic, inorganic basic chem.	20.6	27.8	2.5	3.6	11.2	19.0	6.9	5.2
Manufacture of rubber products	34.1	55.8	2.6	3.3	31.1	41.7	0.4	10.8
Manufacture of plastic products	51.4	52.8	0.0	11.4	50.6	39.1	0.8	2.3
Non-ferrous metals, aluminium	19.5	39.3	3.8	13.9	12.7	25.3	3.0	0.1
Machinery and equipment	32.1	37.8	0.7	6.2	30.6	25.7	0.8	6.0
Railway and tramway locom.	36.5	57.6	1.2	15.7	35.3	41.8	0.0	0.1
Motor vehicles, trailers	17.9	30.5	2.7	0.1	13.5	12.7	1.7	17.7
Manufacture of bicycles and motorcycles	19.4	47.7	0.0	6.0	14.7	14.4	4.7	27.3
Manufacture of transport equipment n.e.c.	5.5	91.4	5.5	0.0	0	0.0	0	91.4
Other manufacturing industries	33.4	23.6	0.2	4.3	30.9	13.8	2.3	6.5
Chemical products ex pharm.	11.4	12.7	0.3	2.7	9.8	6.3	1.3	3.7
<i>Low technology</i>								
Food, beverages, tobacco	9.1	21.8	1.3	2.9	3.9	7.3	3.9	11.6
Textile, clothing, leather	33.7	38.1	11.6	10.4	13.5	8.1	8.6	19.6
Wood and wood products	23.3	52.9	0.5	3.6	22.5	46.0	0.3	3.3
Paper and printing	22.2	26.1	1.6	3.0	19.6	14.6	1.0	8.5
Refined petroleum products	1.8	40.3	0.0	26.9	1.8	13.2	0.0	0.2
Coal and petroleum products	11.5	9.1	0.0	0.0	11.5	9.1	0.0	0.0
Other non-metallic minerals	39.1	49.4	1.9	8.0	30.6	27.7	6.6	13.7
Manufacture of basic metals	17.2	31.8	0.5	2.2	16.2	27.7	0.5	1.9
Fabricated metals	47.0	54.7	2.2	3.0	44.1	47.2	0.7	4.3
Pleasure and sporting boats	4.3	40.8	0.2	21.9	3.8	16.8	0.3	2.1
<i>Manufacturing</i>	<i>26.8</i>	<i>38.2</i>	<i>4.0</i>	<i>8.9</i>	<i>18.9</i>	<i>19.2</i>	<i>3.9</i>	<i>10.1</i>

Source: Éltető (2000)

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