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The Role of Multinational Enterprises in Globalization: An Empirical Overview

by

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Abstract

The activities of multinational enterprises drive the economic globalization process to a very large degree. This paper lists some facts about their dominant role in all channels of globalization. Therefore, the importance of multinational enterprises in foreign direct investment and production abroad is examined as well as their contributions to the international transfer of knowledge and technology and to foreign trade. It is argued that economic theory must account for multinationals' activities in the analysis of the globalization process.

Keywords: Multinational Enterprise, Globalization, Foreign Direct Investment, International Technology Transfer, Foreign Trade

JEL-Classification: F23, F10, F02

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The process of economic integration has accelerated remarkably in the last 15 years. All three main channels of economic globalization, trade, foreign direct investment (FDI) and the international transfer of knowledge and technology, have developed very dynamically. Amongst them, the strong rise of FDI has attracted the most attention, but the increase of international technology transfers is as impressive. International trade continues to grow stronger than world output. The degree of openness has surpassed the pre World War One record levels in many countries.

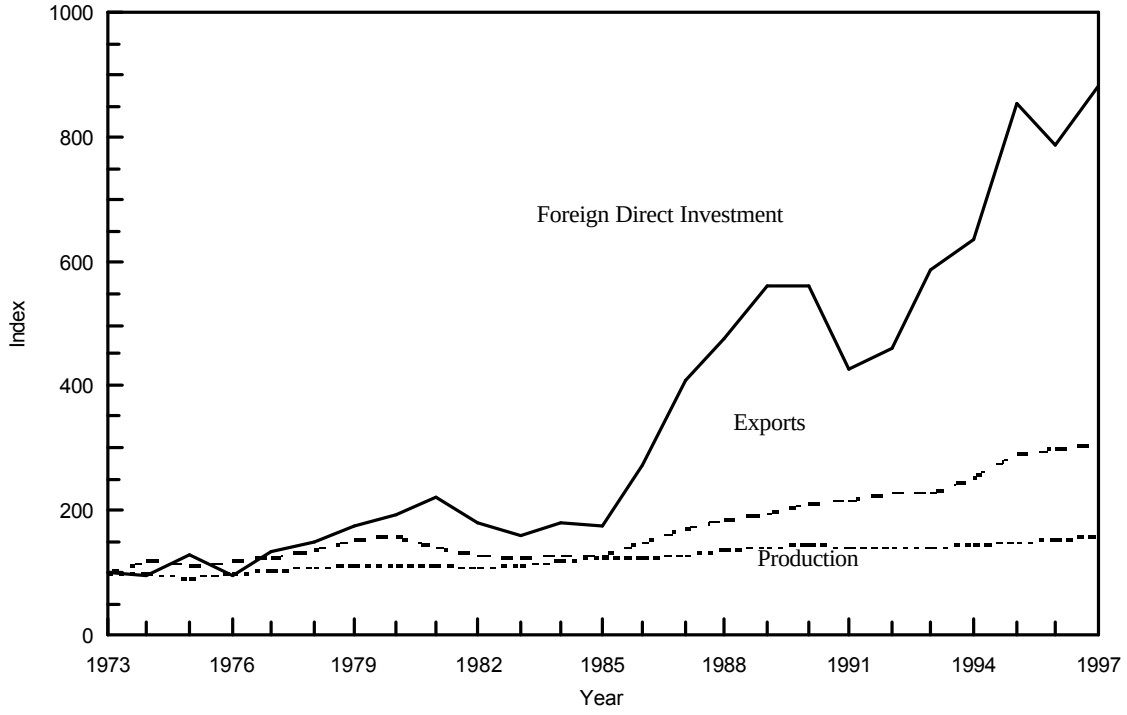
Multinational Enterprises (MNEs) stand at the center of all of these developments. FDI, which is by definition bound to MNEs, is analyzed in the first part of this paper. Long-term developments are characterized as well as sectoral and regional distributions. The second part deals with the international transfer of knowledge and technology. MNEs are the main vehicle of this transfer as can be seen by the 80% of the payments for royalties and license fees, which flew between foreign affiliates and their parent companies in 1995 (UNCTAD 1997). The third part will focus on international trade, especially MNE related international trade. Two phenomena will be of special interest: the large and increasing intra-firm trade and the role of MNEs in trade of intermediate goods. The fourth part concludes from this empirical analysis the need to make the enterprise, not

the country, the basic unit of analysis. Economic globalization must be examined in a theoretical framework of imperfect competition.

1. Foreign Direct Investment

The deepening of world wide economic integration has depended increasingly on rising FDI flows, especially in the last two decades. Up to the mid-nineteen eighties, foreign trade was the most dynamic channel of economic integration. Exports grew much stronger than FDI in the 1950s, 60s and 70s. In the 1980s this pattern changed. 16.3% FDI growth exceeded the 6.2% export growth per year by far (Hillebrandt and Welfens 1998). The increasing integration through stronger growth in trade relative to production and the impressive rise of FDI after 1985 is documented in Figure 1. World real industrial production has risen by 60% over this 24 years period. That is an annual growth rate of 2%. International trade, here shown by the export figures, has increased by 210% over the whole period, or 4.8% annually, more than twice as fast as industrial production. An even more dynamic contribution to economic integration came from FDI. From 1973 to 1997, FDI has increased by 780%. That is an impressive annual growth rate of 9.5%, twice as large as the export growth rate.

Figure 1: World Industrial Production, World Trade and Foreign Direct Investment, 1973–1997[a]



[a] Indices; 1973 = 100. Exports without services. Foreign direct investments adjusted with the US industrial goods price index; 1997 index figure for foreign direct investment contains estimates for some smaller countries.

Source: Siebert (1999).

The sudden and strong increase of FDI in the second half of the 1980s has been often noticed and widely discussed in recent years, but its explanation remains to be one of the challenges to economic research (Graham 1996). Worldwide FDI stocks increased from $ 782 billion to $ 1,768 billion in the second half of the eighties. They more than doubled, therefore, in just six years (Table 1).

Table 1: Inward FDI Stocks 1980-1998 (Mill. $, Current Prices)

	World	Developed countries	USA	EU	Developing countries
1980	506 602	373 658	83 046	185 336	132 945
1985	782 298	545 060	184 615	236 228	237 239
1990	1 768 456	1 394 853	394 911	737 932	370 644
1998	4 088 068	2 785 449	875 026	1 486 237	1 219 271

Source: UNCTAD (1999).

Worldwide FDI continued to grow in the 1990s. In 1998 the world FDI stock reached $ 4,088 Billion. Roughly three quarter were invested in developed countries. Especially the FDI boom in the second half of the 1980s was an OECD countries phenomenon. Approximately 85% of the flows had developed countries as source and as host of FDI (Table 2). In the last decade the share of FDI received by developing countries has been somewhat higher. This higher share results from a FDI boom in China and South-East Asia in the first half of the 1990s. China alone received 12% of all FDI inflows world wide, or one third of all inflows in the developing countries in 1996, South-East Asia another third. After the Asian crisis the strong increase of FDI was mainly driven by a cross-border merger and acquisition wave among developed countries, which increased their share of total FDI inflows to 73.5% in 1999 (UNCTAD 2000).

Table 2: Accumulated Inward FDI Flows (Mill. $, Percentage)

	World	Developed countries	United States	United Kingdom	France	Germany	Canada
1971–76	92 766	66 460	16 851	8 496	6 879	9 084	3 763
1985–90	790 572	672 535	283 680	105 151	43 014	24 823	17 338
1993–98	2 254 450	1 448 320	542 849	177 493	133 296	51 684	59 570
85–90 / 71–76	8.5	10.1	16.8	12.4	6.3	2.7	4.6
Share 1971–76		71.6	18.2	9.2	7.4	9.8	4.1
Share 1985–0		85.1	39.9	13.3	5.4	3.1	2.2
Share 1993–98		64.2	24.1	7.9	5.9	2.3	2.6

Source: IMF (various issues), own calculations.

The share of FDI inflows in the United States increased from 18% in the early 1970s to 40% in the late 1980s[1]. The U.S. experienced the most impressive increase and became by far the largest host country. An interesting picture emerged in the second half of the 1980s with one dominant host country and many large home countries of FDI (Table 3). That was the opposite of the situation in the 1960s and the early 1970s when U.S. companies dominated FDI outflows by investing heavily in other developed countries. The share of world FDI outflows coming from U.S. companies dropped from more than half in the early 1970s to 15% in the second half of the 80s. It recovered again in the 1990s, without regaining its dominant position of the 60s. In the last decade, U.S. outward FDI share has

[1] The differences in the growth rates of inward FDI reflected in Table 1 and 2 result from the devaluation of the U.S. $ after 1985. For FDI statistics' problems compare Klodt (1999).

risen again to 26%. And, the country has continued to be the most important host of FDI although the dominance faded a bit, mostly due to the emergence of China as a large recipient of FDI in the 1990s.

Table 3: Accumulated Outward FDI Flows (Mill. $, Percentage)

	World	Developed countries	United States	United Kingdom	France	Germany	Japan
1971–76	126 179	123 613	71 573	17 721	5 914	10 726	8 610
1985–90	917 493	886 751	142 470	150 337	72 793	85 004	166 870
1993–98	2 242 993	2 107 937	585 284	309 856	167 507	251 029	128 551
85–90 / 71–76	7.3	7.2	2.0	8.5	12.3	7.9	19.4
Share 1971–76		98.0	56.7	14.0	4.7	8.5	6.8
Share 1985–90		96.7	15.5	16.4	7.9	9.3	18.2
Share 1993–98		94.0	26.1	13.8	7.5	11.2	5.7

Source: IMF (various issues), own calculations.

Note that U.S. outward FDI flows experienced only a relative decline in the 1980s, U.S. companies outward FDI flows doubled the early seventies to the late eighties. However, the increase in other developed countries, most notable Japan and the United Kingdom was much larger. The relative fall of U.S. outward FDI would be even larger when adjusted for the higher rate of reinvested earnings in U.S. outflows in the 1980s (Table 4). The high share of reinvested earnings in FDI outflows of the U.S. and the U.K. points to the longer history of internationalization of production of companies in these countries as compared to Japan, Germany and France. Germany's drop in the reinvested earnings ratio can be explained by the strong increase

of outflows which could not have been financed by reinvested earnings alone.

Table 4: Reinvested Earnings Ratio[a]

	United States	United Kingdom	Germany	World
1971–1976	55.9	60.2	21.5	
1985–1990	82.2	48.8	9.3	22.7
1993–1998	54.9	46.0	6.1	25.2

[a] Reinvested earnings relative to FDI outflows

Source: IMF (various issues), own calculations.

The reason for the change in relative positions in FDI among developed countries is not well understood. The drastic change in the U.S. current account does not seem to be the cause, since net FDI flows and the balance of the current account are not correlated for the United States as well as for the other analyzed countries with the possible exception of Japan (Table 5).

Table 5: Correlation Coefficient of Current Account Balance and Net FDI Flows (1960-1997)

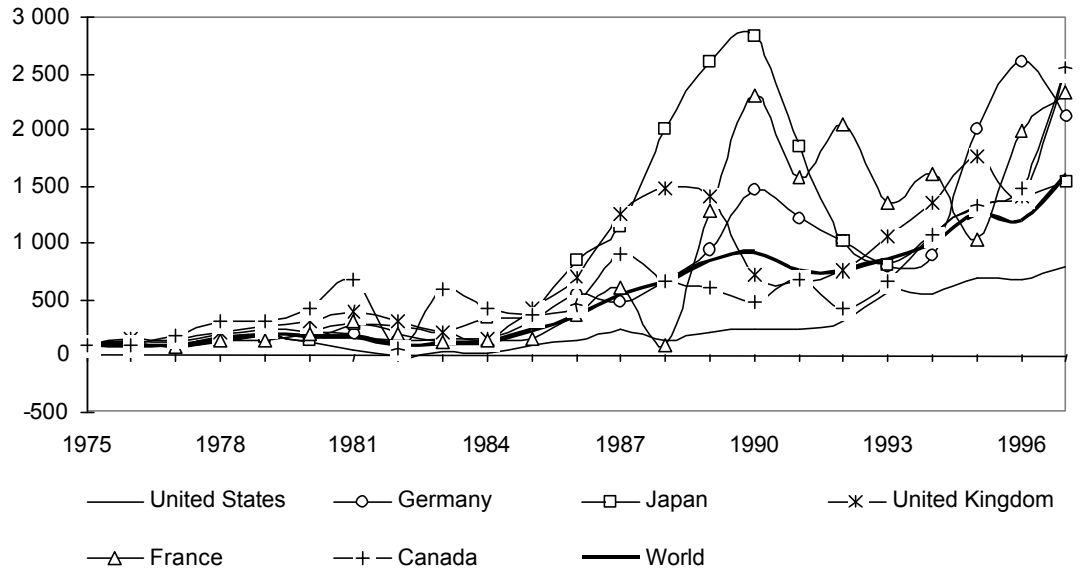
United States	Canada	United Kingdom	France	Germany	Japan
0.197	-0.183	0.0	0.16	-0.055	0.659
Number of observations: 38			Critical value: 0.324		

Source: IMF (various issues), own calculation.

Tables 1 to 4 and Figure 2 point to another phenomenon, too: the cyclical behavior of FDI flows. Knickerbocker (1973) was the first to notice that FDI tends to occur in sectoral and temporal clusters. Flowers (1976), while testing Knickerbockers theory of oligopolistic reaction, found country-

specific temporal and sectoral FDI clusters. Investments from different countries occur at different times. The clustering of investments disappeared when various countries were examined. Investors only seem to react to activities of their national competitors.

Figure 2: Temporal Clusters of FDI Outflows (1975=100)



Source: IMF (various issues), own calculation.

Figure 2 shows the highly volatile series of outward FDI of six countries. Since booms and droughts do not occur at the same time in different countries, the aggregated world FDI outflow series is much smoother, although booms and recessions are observable in world FDI outflows, too. So far, oligopolistic reaction is the theory used to explain the wave behavior, in spite of some shortcomings (Graham 1996). Kleinert (1999)

gives another explanation for the wave behavior within a general equilibrium model of the emergence of MNEs. According to his work, waves result from changes in the competitive conditions induced by FDI of a national competitor. Although this approach receives some support from the empirical results of Flowers (1976), it has not been tested empirically yet.

The large share of intra-industry FDI is another striking phenomenon. Cantwell and Sanna Randaccio (1992) presented large and increasing shares of intra-industry direct investment in the EU. Furthermore, they show that FDI often takes place in technology-intensive industries. This points to imperfect competition models (Brainard 1993; Markusen and Venables 1998) as explanation for FDI activity, rather than perfect competition models (Helpman 1984).

2. International Transfer of Knowledge and Technology

The international transfer of knowledge and technology, measured here as payments for royalties and licensing fees, rose at about the same rate as FDI flows in the last two decades. Technology payments increased from $ 12 billion in 1983 to $ 65 billion in 1999 (UNCTAD 1997, 2000). The annual growth rate of 11.1% in the 1990s even exceeded FDI outflow growth

(9.9%). The parallel increase could be a first hint to the dominant role of MNEs in the international transfer of knowledge and technology.

The regional distribution of royalties and license fees payments (Table 6) is more strongly dominated by developed countries than the regional structure of inward FDI stocks (Table 1). This is not surprising, given the advantage of MNEs in the production of technology intensive goods and their larger capacity to develop and absorb new technologies. A large share of all payments for the use of imported technology comes from developed countries. The regional concentration is even stronger on the receipts side of royalties and license fees. The U.S. alone received about 58% of all royalties and license fees in the 1990s, Japan, the U.K., Germany and France 10%, 9%, 6% and 4%, respectively. These large players hold strong positions in payments as well as in receipts of royalties and license fees. According to UNCTAD data, international transfer of technology takes place almost without developing countries. Developed countries account for 98,3% of all receipts and 88.3% of all payments. Among the developing countries, South Korea holds the highest shares, with one third of the payments and one fifth of the receipts within the developing countries group.

Table 6: Accumulated Payments of Royalties and Fees (Mill. $, per cent)

	World	Developed countries	United States[a]	United Kingdom	France	Germany	Japan[b]
1980–1989			12 470			17 358	
1990–1997	308 756	272 696	47 400	22 530	16 600	37 970	57 610
90–97 / 80–89			3.80			2.19	
Share 90–97		88.3	15.4	7.3	5.4	12.3	18.6

[a] 1982-89 BEA (1999), [b]1991-1997

Source: IMF (various issues), Bureau of Economic Analysis (1999), own calculations.

A high share of technology flows are intra-firm flows (Table 7). Using data from the U.S., Japan and Germany, UNCTAD (1997) calculated this share to be about 80% of all flows. That shows the important role of MNEs to overcome market imperfections on markets for information goods. Further, this 80% share documents the internalization advantage, which, according to the OLI paradigm (Dunning 1980), is necessary for a MNE to be superior to a licensing agreement with an independent foreign company.

The intra-firm share in Table 7 is biased downwards, because the numbers of cross-border royalties and license fees include payments for copyright of software, books, film, live entertainment and other consumer to

Table 7: Cross-Border Royalties and License Fees Receipts (Mill. $)

	U.S. Receipts	Intra-Firm	Intra-Firm Share	Germany Receipts	Intra-Firm	Intra-Firm Share
1982	5 603	3 377	60.3			
1990	16 634	13 251	79.7	1 990		
1998	36 808	26 761	72.7	3 250	2 454	75.5

Source: Bureau of Economic Analysis (various issues), Deutsche Bundesbank (2000), IMF (various issues), own calculations.

business fees, which cannot be internalized within a firm. The intra-firm share in business-to-business knowledge transfers is larger than 80% and did not fall in the 1990s. The falling share in the last decade which is given in Table 7 results exclusively from increasing importance of technology payments in the business-consumer-relationship.

Table 6 shows the rise of international technology flows in the globalization era. New knowledge and technology is spread almost immediately to other developed countries. This phenomenon can also be observed from patent applications given in Table 8. Increasingly, patents are applied for not only to the authorities of the “home country“ but to external authorities, too. However, patent applications are costly. Therefore, applications in foreign countries point to a reduction of other sources which used to protect knowledge as information asymmetries between companies from different countries. Furthermore, it may point to a faster penetration of

foreign markets not only by exports but also by production in foreign countries.

Table 8: Patent Applications

	Germany			Japan			United States		
Year	Resident App.	Foreign Share[a] (%)	External Ratio[b]	Resident App.	Foreign Share (%)	External Ratio	Resident App.	Foreign Share	External Ratio
1980	30 582	54.2	2.70	165 730	14.5	0.27	106 218	41.5	1.87
1985	32 708	56.8	2.87	274 348	10.2	0.27	120 589	47.2	2.35
1990	30 928	67.5	5.08	332 952	11.5	0.39	175 333	48.3	3.26
1994	37 199	64.5	5.36	319 344	13.6	0.44	207 255	48.1	5.97
1997	45 105	66.5	9.61	349 211	16.0	1.09	230 336	48.1	13.26

[a] (Non-resident patent applications / National patent applications)*100
National patent applications = Non-resident patent applications + Resident patent applications.
[b] External patent applications / Resident patent applications.

Source: OECD (2000), own calculations.

The importance of knowledge production, here proxied by the number of resident patent applications, has increased in all three economies over the last two decades. This fact and the internationalization of the use of this knowledge have led to a rising internationalization of knowledge protection. In 1997, an U.S. company applied (on average) for a patent in the United States and in 13 other countries, compared to two other countries in 1980. In the same vein, the foreign share of national applications has grown in all three countries. Increasing international technology flows are protected by a rising number of patents given by foreign countries authorities.

That does not say anything about the internationalization of knowledge production, but about the internationalization of the use of knowledge. The internationalization of knowledge production has not kept pace with the globalization of trade and production. Even large companies in most cases perform most of their R&D at home (Pavitt and Patel 1999). On an aggregated level, only U.S. data are available. Table 9 points to growing R&D activities of foreign affiliates of U.S. MNEs in absolute numbers but a rather constant share of these activities in the whole expenditure for R&D of U.S. MNEs at about 10%. Globalization includes increasing international flows of knowledge and technology but not the internationalization of knowledge production on a large scale. Knowledge production remains a task predominantly performed in the home country. The large and rising flows of knowledge from the home country to the host countries (Table 6) reflect the dependence of the internationalized production on the headquarter service research and development which is supplied by the parent company. U.S. parent companies received royalties and license fees of 23.3 billion $ in 1999 but bought technology for 2.0 billion $ only. U.S. affiliates of foreign MNEs received 7.7 billion $ and paid 1.6 billion $ (Bureau of Economic Activities 2000a, 2000b). Foreign R&D activities often focus on the application of production processes and goods on the conditions in the foreign market.

Table 9: R&D Expenditure of U.S. MNEs and U.S. Affiliates of Foreign MNEs (Million U.S.$, current prices, %)

Year	U.S. parents	Foreign affiliates of U.S. MNEs	Foreign affiliates Share[a] (%)	U.S. affiliates of foreign MNEs
1982	38 157	3 647	8.72	3 744
1989	59 925	7 048	10.52	9 465
1991	67 457	9 358	12.18	11 772
1995	96 500	14 075	12.02	17 500
1998	114 201	14 986	11.60	19 690 [b]

[a] R&D expenditure of foreign affiliates of U.S. MNEs / (R&D expenditure of U.S. parent + foreign affiliates of U.S. MNEs)*100, [b] 1997

Source: Bureau of Economic Activity (various issues), own calculations.

One phenomenon of globalization is the rising speed at which new know how and technology spreads over national borders, especially among developed countries. MNEs are the most important vehicle of international knowledge transfer. Intra-firm transfers of technology account for a very large share of technology flows. However, the internationalization of knowledge production has not increased significantly over the last two decades. The headquarter service knowledge is produced at home and exported to the foreign affiliates of a MNE. Growing trade in headquarter services contributes to the rise in trade in services.

3. International Trade

Traditionally, trade has been the most important channel of the integration of the world economy. It has been only very recently, that the strong rise in FDI challenges the role of trade in goods and services as the most important

aspect of globalization. Since the end of World War II, international trade has pushed world economic integration. Its growth rates have exceeded production growth rates by far, pointing to a deepening of integration (Figure 1).

Merchandise exports have almost tripled in nominal terms since 1980. Like FDI flows and the transfer of know how and technology, trade takes place mostly among developed countries (Table 10). Their merchandise export share have remained relatively stable at about two third over the last two decades. The emergence of the Asian exporting countries has not changed this dominance of the developed countries. Trade in services has grown a bit faster than trade in goods. Its share in total trade has risen marginally to about 20% (WTO various issues) in 1999.

A large share of trade especially between developed countries takes place within the same industry (Grubel and Lloyd 1971). These high intra-industry trade (IIT) shares are mainly explained by imperfect competition

Table 10: World Merchandise Exports (Billion U.S. $) and Regional Export Shares (%)

	World	Developed Countries	EU[a]	USA	Developing Countries
1980	1 932	65.5	36.4	11.7	34.5
1985	1 875	68.4	35.6	11.7	31.6
1990	3 423	71.7	40.5	11.5	28.3
1995	5 104	68.0	40.4	11.5	32.0
1999	5 577	66.9	39.1	12.6	33.1

[a] EU-15 including intra-EU exports, before 1995 excluding Belgium.

Source: IMF (2000), own calculations.

in world markets. Companies sell differentiated - not homogenous – goods in an environment which includes trading and other transaction costs. The development of a new group of international trade models, the new trade theory, was motivated by the empirical findings of the composition of trade, especially these high IIT shares (Greenaway and Torstensson 1997). Comparative advantages are not seen as the driving force behind IIT, although advantages which result from technological differences can also explain intra-industry trade. Table 11 shows IIT-shares of Germany and its most important trading partners on basis of bilateral trade volumes. The IIT share of German trade with European countries is especially high. With France, Germany's largest trading partner, it even exceeded 80% in 1996. High trade volumes seem to be related to high IIT shares. The rank correlation coefficient between the IIT share and the volume of bilateral

German trade with its 13 European trading partners is 0.94, which exceeds the critical value of 0.55.

Table 11: Inter- and Intra-Industry Trade Shares of Germany and Its Most Important Trading Partners (%)

	European Union		United States		Japan	
	1988	1996	1988	1996	1988	1996
Inter-Industry Trade	36.7	32.9	55.8	35.7	64.8	57.6
Intra-Industry Trade	63.3	67.1	44.2	64.3	35.3	42.4

Source: Heitger, Schrader and Stehn (1999: 107).

These high IIT shares result at least partially from trade in intermediate goods. Imports of intermediate goods and raw materials make up for approximately half of all imports of developed economies. This is in part due to differences in the endowments with commodities among the countries. Raw material processing industries as wood products and furniture, paper and paper products, petroleum and coal products, non-metallic mineral products, iron and steel and non-ferrous metals are especially import dependent. The share of imported inputs, mainly raw materials, in total imports in these industries is very high as seen in the third column of Table 12. But for manufacturing sectors as non-electrical machinery, professional goods, or motor vehicles, where the production process is likely to be less raw material dependent, the share of imported input in total input is very high also, with approximately 50% (fourth column of Table 12).

Table 12: Share of Imported Inputs in Total Imports 1990

Country	Agriculture, Mining and Manufacturing	Raw Material Intensive Industries[a]	Technology Intensive Industries[b]
Australia	52.4	80.5	45.5
Canada	55.4	72.4	53.5
Denmark	57.6	86.6	46.5
France	56.5	84.4	47.7
Germany	53.0	77.4	44.8
Japan	70.8	91.7	48.0
Netherlands	63.5	88.5	52.8
United Kingdom	58.2	86.1	53.4
United States	48.4	71.4	40.5

[a] Wood products and furniture, paper, paper products and printing, petroleum and coal products, non-metallic mineral products, iron and steel, non-ferrous metals.

[b] Industrial chemicals, drugs and medicine, rubber and plastic products, metal products, non-electrical machinery, office & computing machinery, electrical apparatus, radio, TV & communication equipment, shipbuilding & repairing, motor vehicles, aircraft, other transport, professional goods.

Source: OECD (1997), own calculations.

The most interesting group for this paper is the one which is called here technology intensive industries. The largest share of inputs in the production of goods in these industries usually comes from the same industry. Their production process involves many different stages, with different requirements. Reasons for the import of intermediates can be manifold. Of course, availability is a motive for trade. Differences in factor content could be a reason to import some parts from countries with comparative advantages for the production of this input. Technological leadership of a company in a foreign country can be another reason to import the intermediate input. Furthermore, established networks can be the

source of increasing intermediate trade when companies internationalize their production.

Table 13 shows the change of the imported inputs share of the technology intensive sectors over the 1970s and 1980s.[2] The share of imported inputs to total imports of these technology intensive sectors kept stable at about 50% over the 1970s and 80s. Only in the United Kingdom the share increased noticeable from the lowest level of all countries. It converged to levels of other OECD countries. The trade in intermediate goods in these sectors increased, therefore, as fast as total trade.

Since total trade has experienced a strong increase in the last three decades and has grown faster than production, imported inputs used in production have increased relative to domestic inputs. Table 14 shows imported intermediate inputs as share of total intermediate goods which are used in production, compared to its share in total imports which was shown in Table 12 and 13.

[2] More recent data is not available from this OECD Input-Output Dataset.

Table 13: Imported Inputs Share in Total Imports of the Technology Intensive Sectors (1970-1990)

Country	1970	1975	1980	1985	1990
Australia	50.7 [a]	50.2 [b]		51.7 [c]	45.5 [d]
Canada	53.1 [e]	49.9 [f]	47.7 [g]	51.0 [c]	53.5
Denmark	45.7 [h]	45.9 [i]	47.5	47.4	44.3
France	51.6 [h]	51.6 [i]	52.6	52.3	47.7
Germany			52.1 [j]	50.6 [c]	44.8
Japan	43.3	53.7	60.0	60.1	48.0
Netherlands	54.3	52.3	58.8 [g]	52.8 [c]	
United Kingdom	35.0 [a]		48.7	41.3	53.4
United States	40.5 [h]	41.1 [i]	40.9 [k]	44.2	40.5

[a] 1968, [b] 1974, [c] 1986, [d] 1989, [e] 1971, [f] 1976, [g] 1981, [h] 1972, [i] 1977, [j] 1978, [k] 1982

Source: OECD (1997), own calculations.

Table 14: Share of Imported Intermediate Goods in Total Intermediates Used in Technology Intensive Sectors

Country	1970	1975	1980	1985	1990
Australia	17.8 [a]	20.3 [b]		24.1 [c]	23.7 [d]
Canada	31.5 [e]	33.9 [f]	34.6 [g]	40.8 [c]	40.0
Denmark	45.7 [h]	45.9 [i]	47.5	47.4	44.3
France	18.3 [h]	20.0 [i]	21.1	24.4	24.6
Germany			15.2 [j]	16.9 [c]	16.8
Japan	3.4	3.8	5.0	4.9	5.2
Netherlands	47.4	47.1	52.4 [g]	49.9 [c]	
United Kingdom	12.6 [a]		22.8	28.0	30.7
United States	5.1 [h]	6.3 [i]	7.5 [k]	9.3	11.0

[a] 1968, [b] 1974, [c] 1986, [d] 1989, [e] 1971, [f] 1976, [g] 1981, [h] 1972, [i] 1977, [j] 1978, [k] 1982

Source: OECD (1997), own calculations.

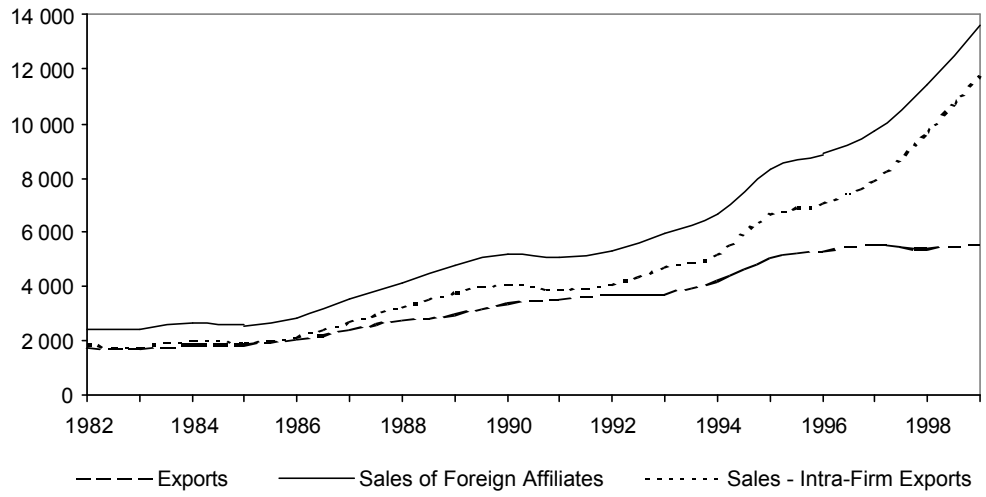
Table 14 shows large national differences. Small countries tend to rely much more on imported inputs than large countries do. Due to economies of scale, large countries can support every stage of production in many

differentiated goods more easily than small countries (Hummels et al. 1998). This could explain the low import shares of intermediate goods used in production in the United States, Japan and Germany. Especially Germany's low share is surprising since it is situated in an integrating area with generally high trade volumes and a distinct separation of labor. Australia suffers from its geographical 'isolation', which lowers the degree of openness.

The import share of intermediate goods used by companies in these nine countries has increased from 14.2% in the early 1970s to 19.3% in 1990. That is an increase of 36 per cent in 20 years. This figure indicates a higher integration of these countries into the world economy in the 1990s than in the 1970s. Larger imports of intermediate goods could be the link between larger foreign production and larger international trade (Kleinert 2000). With increasing FDI stocks, the share of production which takes place in foreign affiliates of MNE has been on the rise, too. Affiliates' sales in foreign countries overtook exports in the late 1970s and have continued to grow at higher rates (Figure 3). Sales of foreign affiliates give the upper bound of "foreign production" since they include sales of "pure" sales units, which import finished goods and sell them to local consumers. Sales minus intra-firm exports give the lower bound. All intra-firm exports are thought

of as finished goods' exports, value added generated by processing intra-firm intermediated exports by foreign affiliates is not accounted for.

Figure 3: Exports and Sales of Foreign Affiliates 1982-1998 (Billion $)



Source: UNCTAD (1998, 1999).

The expanding MNE network, connected through intense trade relations between parent companies and affiliates and among the affiliates, could be the explanation for growing trade and growing production abroad. Substitution of exports by foreign production may occur but new trade opportunities are also opened up with the internationalization of production. In 1994, more than half of all U.S. American MNEs intra-firm exports were exports in intermediate goods (Bureau of Economic Analysis 1998), the intermediate goods share of about two-thirds of total exports of Swedish MNEs in 1990 was even higher (Andersson and Fredriksson 2000).

The increase in intra-firm trade volume is well-documented fact. UNCTAD (1998) estimated the intra-firm trade share of total trade to be about one third. Table 15 shows the rising share of U.S. MNE intra-firm trade in the last 20 years. In contrast, intra-firm exports of U.S. affiliates of foreign MNEs decreased in its share in the total U.S. exports from 11.6% in 1982 to 8.4% in 1998. That slowed the increase in the total intra-firm export share. In 1998 35.6% of U.S. exports were intra-firm exports compared to 33.5% in 1982 (Bureau of Economic Analysis various issues). However, the role of MNEs in trade is larger than the 35% intra-firm trade. About 65% of total U.S. exports in 1998 have been related to U.S. MNEs, i.e. at least one of the trading partners belonged to an U.S. MNE. Adding the 8% U.S. exports which are due to foreign MNEs intra-firm trade gives the lower bound of the role of MNEs on U.S. exports. The role of U.S. and foreign MNEs in U.S. imports with at least 61% in 1998 is almost as important.

MNEs hold an important position in international trade. Approximately a third of world wide trade takes place within MNEs, about 80% involve at

Table 15: U.S. MNE-related U.S. Exports (Mill. US $, current prices, %)

Year	Total Exports	U.S. MNE-Related Exports	Intra-U.S. Firm Exports	Share (Intra-Firm/ Total Exports)*100
1982	212 275	163 383	46 559	21.9
1985	218 815	171 904	57 567	26.3
1989	363 836	236 371	86 050	23.7
1991	421 763	262 005	115 258	27.3
1993	465 090	274 666	113 762	24.5
1995	584 742	362 610	149 740	25.6
1997	689 182	441 272	183 062	26.6
1998	682 138	438 292	185 372	27.2

Source: Bureau of Economic Analysis (various issues), own calculations.

least one MNE at one side of the transaction. This trade is increasingly intra-industry trade and consists to a half of intermediate goods trade. International trade is concentrated on the developed countries which intensified their trade relations as can be seen by a stronger rise of trade relative to production.

4. Conclusion

Globalization is a process which converts separate national economies into an integrated world economy. This includes a deepening and a widening of economic integration. The widening results from the inclusion of new countries like the developing countries of Latin America or the former socialist countries in Central and Eastern Europe in the global economic system. The deepening, on which this paper is focused, predominantly takes place among the developed countries. The intensive use of three channels

gave economic integration in the era of globalization a new quality: international trade, foreign direct investment and international technology flows.

Internationalization of economic activity is driven to a large extent by MNEs. At least 80% of all international trade is related to at least one MNE. A third takes place within MNEs. A large share of it is intra-industry trade between developed countries. That includes a large share of trade in intermediate goods. The same holds for FDI, which is strongly concentrated on developed countries. Intra-industry investment is also large and concentrated in some industries. FDI flows are more volatile than trade flows. FDI occurs in waves with different cycles for different countries. The concentration on developed countries is strongest in technology flows. Their increase, driven by intra-MNEs flows, which account for 80% of all flows of technology, points to the internationalization of knowledge and technology use. However the internationalization of knowledge production remains rather modest. Research and development remains a headquarter service which is supplied by the parent company and applied by foreign affiliates.

The dominant role of large players in the globalization process calls for an explicit modeling of MNEs in the globalization process. The existence

and importance of large players with room for strategic decisions about trade, FDI, foreign production and technology transfers must be accounted for in analyses of economic globalization. Therefore, an imperfect competition framework is needed. Market imperfections, which are essential for the understanding of MNEs, must be incorporated. Hence, an analysis of globalization should be based rather on proximity-concentration models à la Brainard (1993) and Markusen and Venables (1998) than on factor-proportion theories.

Reference List

Andersson, T., and T. Fredriksson (2000). Distinction between intermediate and finished products in intra-firm trade. *International Journal of Industrial Organization* 18: 773–792.

Brainard, S.L. (1993). A Simple Theory of Multinational Corporations and Trade with a Trade-off between Proximity and Concentration. NBER Working Paper Series 4269. National Bureau of Economic Research, Cambridge, Mass.

Bureau of Economic Analysis of the U.S. Department of Commerce (1999). *Survey of Current Business.* Washington, D.C.

— (2000). Foreign Direct Investment in the United States. *Survey of Current Business* 80 (9): 31–60.

Bureau of Economic Analysis of the U.S. Department of Commerce (various issues). *Survey of Current Business.* Washington, DC.

— (2000). U.S. Direct Investment Abroad. *Survey of Current Business* 80 (9): 61–90.

Bureau of Economic Analysis of the U.S. Department of Commerce (1998). *U.S. Direct Investment Abroad: 1994 Benchmark Survey, Final Results.* Washington, DC.

Cantwell, J.A., and F. Sanna Randaccio (1992). Intra-Industry Direct Investment in the European Community: Oligopolistic Rivalry and Technological Competition. Discussion Papers in International Investment and Business Studies, Series B 160. Univ. of Reading, Dep. of Economics, Reading.

Deutsche Bundesbank (2000). *Technologische Dienstleistungen in der Zahlungsbilanz. Statistische Sonderveröffentlichung 12.* Frankfurt am Main.

Dunning, J.H. (1980). Towards an Eclectic Theory of International Production: Some Empirical Tests. *Journal of International Business Studies* (11): 9–31.

Flowers, E.B. (1976). Oligopolistic Reaction in European and Canadian Direct Investment in the United States. *Journal of International Business Studies* (7): 43–55.

Graham, E.M. (1996). The (not Wholly Satisfactory) State of the Theory of Foreign Direct Investment and the Multinational Enterprise. *Economic Systems* 20 (2/3): 183–206.

Greenaway, D., and J. Torstensson (1997). Back to the Future: Taking Stock on Intra-Industry Trade. *Weltwirtschaftliches Archiv* 133 (2): 249–269.

Grubel, H.G., and P.G. Lloyd (1971). The Empirical Measurement of Intra-Industry Trade. *The Economic Record* 47: 494–517.

Heitger, B., K. Schrader, and J. Stehn (1999). *Handel, Technologie und Beschäftigung*. Kieler Studie 298. Tübingen: Mohr Siebeck.

Helpman, E. (1984). A Simple Theory of International Trade with Multinational Corporations. *Journal of Political Economy* 92 (3): 451–471.

Hillebrand, R., and P.J. Welfens (1998). Globalisierung der Wirtschaft. In D. Cassel (ed.), *50 Jahre Soziale Marktwirtschaft*, Vol. 57. Stuttgart.

Hummels, D.L., D. Rapoport, and K.-M. Yi (1998). Vertical Specialization and the Changing Nature of World Trade. *Economic Policy Review* 4 (2): 79–99.

IMF (International Monetary Fund) (various issues). *Balance of Payments Statistics Yearbook.* Washington, D.C.

— (2000). *International Financial Statistics* . Washington.

Kleinert, J. (2000). Growing Trade in Intermediate Goods: Outsourcing, Global Sourcing or Increasing Importance of MNE Networks? Kiel Working Papers 1006. The Kiel Institute of World Economics, Kiel.

— (1999). Temporal Clusters in Foreign Direct Investment. Kiel Working Papers 930. The Kiel Institute of World Economics, Kiel.

Klodt, H. (1999). International Direct Investment: Export of Headquarter Services or Export of Jobs? In W. Filc, and C. Köhler (ed.), *Macroeconomic Causes of Unemployment: Diagnosis and Policy Recommendations*. Berlin: Dunker&Humblot.

Knickerbocker, F.T. (1973). *Oligopolistic Reaction and Multinational Enterprise*. Boston: Havard University.

Markusen, J.R., and A.J. Venables (1998). Multinational Firms and the New Trade Theory. *Journal of International Economics* 46 (2): 183–203.

OECD (2000). *Basic Science and Technology Statistics. MAXDATA CD-ROM*. Paris.

OECD (1997). *The OECD Input-Output Database*. Paris.

Pavitt, K., and P. Patel (1999). Global Corporations and National Systems of Innovation: Who Dominates Whom? In D. Archibugi, J. Howells, and J. Michie (ed.), *Innovation Policy in a Global Economy*. Cambridge: University Press.

Siebert, H. (1999). *The World Economy*. London: Routledge.

UNCTAD (1997). *World Investment Report 1997*. New York.

— (1998). *World Investment Report 1998*. New York.

— (1999). *World Investment Report 1999*. New York.

— (2000). *World Investment Report 2000*. New York.

World Trade Organization (various issues). *Annual Report*. Geneva.