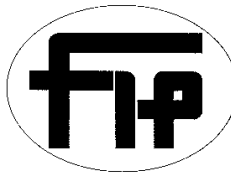No. 61 / 2002

Economic Relations Between Germany and Japan-An Analysis of Recent Data

Werner Pascha

herausgegeben von / edited by

Carsten Herrmann-Pillath, Werner Pascha, Markus Taube

für / on behalf of

Gerhard Mercator Universität Duisburg

Fakultät 3: Wirtschaftswissenschaft

FIP

Forschungsinstitut
für wirtschaftliche
Entwicklungen im
Pazifikraum e.V.

Economic Relations Between Germany and Japan - An Analysis of Recent Data

by Werner Pascha

Keywords

Abstract

The author takes a close look at bilateral German-Japanese trade and direct investment data, employing various techniques (intensity indicators, RCA, intra-industry trade). It turns out that German-Japanese trade and FDI links are indeed rather limited, as has frequently been stated. A number of somewhat surprising pieces of evidence do emerge, though. For competitive industries and with respect to emerging opportunities, the bilateral figures do show a healthy performance.

Summary

The author takes a close look at bilateral German-Japanese trade and direct investment data, employing various techniques, namely:

- single- and double-relative trade intensity measures,
- revealed comparative advantage (RCA) indices of various industries,
- bilateral intra-industry trade coefficients,
- single- and double-relative foreign direct investment (FDI) intensity measures.

It turns out that German-Japanese trade and FDI links are indeed rather limited, as has frequently been stated. A number of somewhat surprising pieces of evidence do emerge, though:

- While trade intensity between Germany and Japan is low in both directions, it has *not* declined in recent years.
- Germany´s trade intensity with the US is *lower* than with Japan, and Japan´s trade intensity is declining vis-à-vis the US, *not* vis-à-vis Germany.
- German machinery exports to Japan show a high absolute volume, but reveal a comparative *dis*advantage – this does not hold for road vehicles, though, which also have a high RCA.
- German consumer goods have, contrary to frequently held beliefs, developed a revealed comparative *advantage* vis-à-vis Japan in recent years.
- While Germany and Japan show certain similar strengths in their bilateral trade (cars, other machinery, etc.), the level of intra-industry trade in the important categories has still not reached proportions of German trade within the EU or with the US; in that respect, links with Japan still have not quite matured.
- Germany profited from remarkably strong Japanese foreign direct investment (FDI) associated with the latter´s move into the EU Common Market.
- More recently, FDI dynamism for both countries has shifted away from the bilateral link, which for FDI is now even less intense than for trade.

The author concludes that while the bilateral links are indeed quite weak, the situation is not as bleak as may appear at first sight. Rather, for competitive industries and with respect to emerging opportunities, the bilateral figures do show a healthy performance. New challenges are currently rather sought elsewhere, though. It depends on the two economies overcoming their current weakness and regaining their dynamism, whether *bilateral* economic relations will (again) become more dynamic as well.

Figures

Tables

Economic Relations Between Germany and Japan -
An Analysis of Recent Data

Werner Pascha, Duisburg University, Duisburg/Germany[*]

pascha@uni-duisburg.de

(June 2002)

1. Introduction and overview

It has become a well-worn argument that economic relations between the world´s second and third largest economies, namely Japan and Germany, are rather limited, particularly if compared with the links of both countries with the world´s no. 1 economy, the US. However, this view is usually only supported by rather general data. For instance, German exports to Japan in 2000 reached only about a fifth of the export level to the US, and from Japan´s point of view, exports to the US were more than seven times as large as those to Germany.

In this paper we try to take a closer look at trade and direct investment data than earlier studies had done (e.g., Kreft 1994, Laumer 1998), employing various techniques to calculate meaningful coefficients:

- single- and double-relative trade intensity measures,
- revealed comparative advantage (RCA) indices of various industries,
- bilateral intra-industry trade coefficients,
- single- and double-relative foreign direct investment (FDI) intensity measures.

This effort is worthwhile, because, while finding new empirical support for a number of conventional views held about bilateral relations between Germany and Japan, a number of somewhat surprising pieces of evidence do emerge:

- While trade intensity between Germany and Japan is low in both directions, it has *not* declined in recent years.

- Germany´s trade intensity with the US is *lower* than with Japan, and Japan´s trade intensity is declining vis-à-vis the US, *not* vis-à-vis Germany.

- German machinery exports to Japan show a high absolute volume, as is well known, but reveal a comparative *dis*advantage – this does not hold for road vehicles, though, which also have a high RCA.

- German consumer products (here defined as category 8 of the international trade classification) have, contrary to frequently held beliefs, developed a revealed comparative *advantage* vis-à-vis Japan in recent years.

- While Germany and Japan show certain similar strengths in their bilateral trade (cars, other machinery, etc.), the level of intra-industry trade in the important categories has still not reached proportions of German trade within the EU or with the US; in that respect, links with Japan still have not quite matured.

- Germany profited from remarkably strong Japanese foreign direct investment (FDI) associated with the latter´s move into the EU Common Market.

- More recently, FDI dynamism for both countries has shifted away from the bilateral link, which for FDI is now even less intense than for trade.

We conclude that while the links between the world´s second- and third-ranking economies are indeed quite weak, the situation is not as bleak as may appear at first sight. Rather, for competitive industries and with respect to emerging opportunities, the bilateral figures do show a healthy performance. Still, *new* challenges are currently rather sought elsewhere. It depends on the two economies overcoming their current weakness and regaining their dynamism, whether *bilateral* economic relations will (again) become more dynamic as well.

2. Current trade relations

Before entering this analysis, we present a basic overview of current bilateral trade relations, putting Germany in an EU framework. Figures 1 and 2 give an overview over bilateral trade in recent years. As for Germany´s position within the EU (Allen 2002), the country is the EU´s main trading partner with Japan; its export share was 29 percent and its import share is

27 percent of all European trade with Japan in 2000. The second ranking member country in terms of exports to Japan is France with some 12 percent, and the Netherlands in terms of imports with about 13 percent. The difference to Germany´s figures is significant.

Figure 1: German exports to Japan, in 1000 Mio. DM
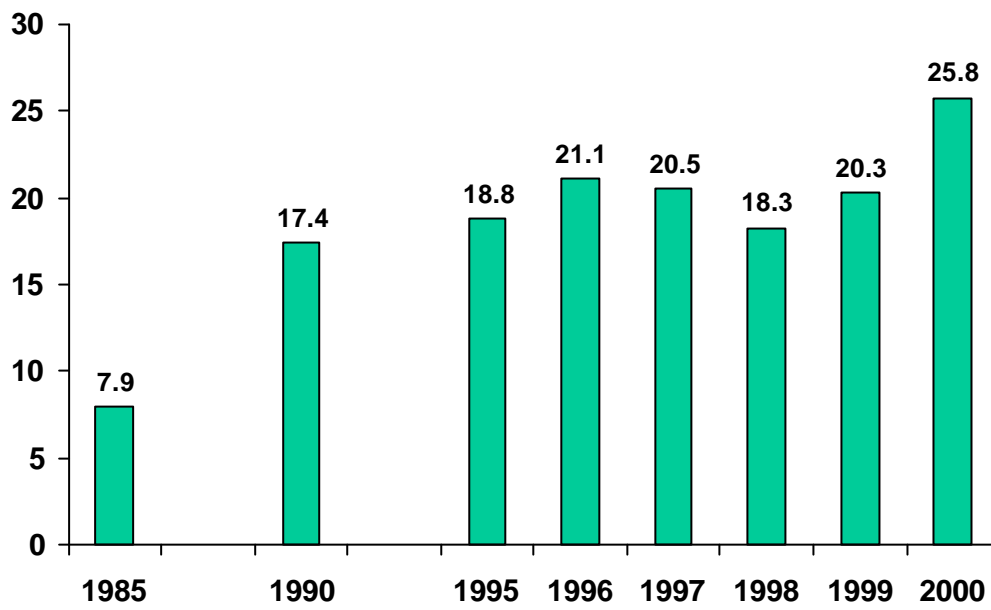
Source: German Statistical Office

Figure 2: German imports from Japan, in 1000 Mio. DM
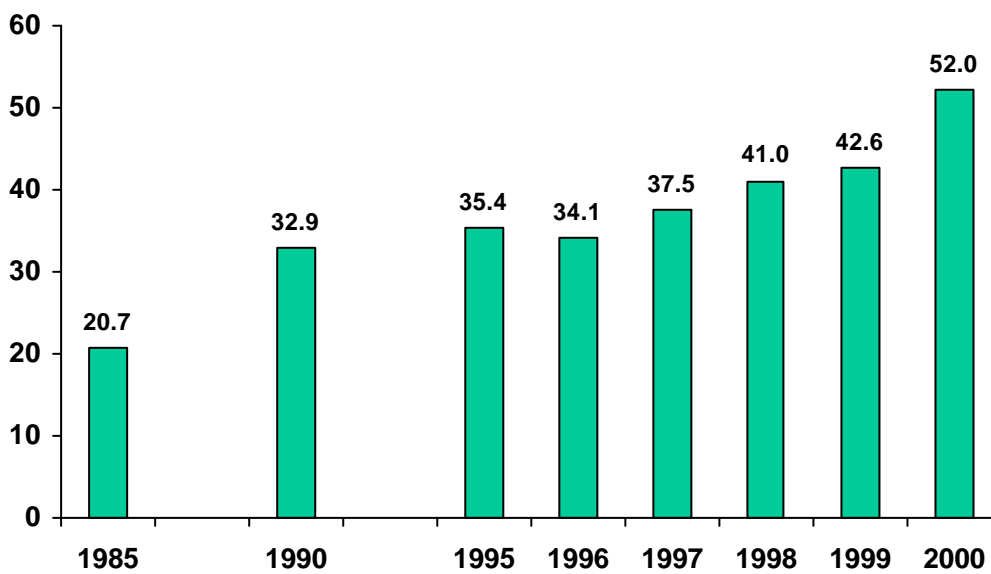
Source: German Statistical Office

Looking at recent changes and concentrating on the period since 1995, though, Germany´s preeminence has been slowly declining. Between 1995 and 2000, Germany lost some one or two percentage points in terms of share (tables 1 and 2), while the most dynamic member country in this context has been Ireland, which raised its export share from 3 to 7 percent, due to its successful move into modern industries and based on favourable cost and tax conditions as well as – some would add - subsidies. As for imports, the Netherlands became a dynamic trading partner of Japan, raising its share from 10 to 13 percent. While its economy is rather small, its growing role as an import gate to the Common Market and intermediate imports for Japanese direct investment in the country may have been important reasons.

Table 1: Exports of EU member states to Japan (in %)

	1995	1996	1997	1998	1999	2000
Belg.-Lux.	5.0	5.4	5.1	4.9	5.7	5.3
Denmark	4.2	3.7	3.9	3.8	4.3	4.3
Germany	30.6	31.0	28.9	29.5	29.3	29.4
Greece	0.2	0.2	0.2	0.2	0.2	0.2
Spain	2.8	2.5	2.7	2.9	3.0	2.7
France	13.2	12	12.1	13.4	12.2	12.2
Ireland	3.0	3.0	4.0	4.6	5.4	7.1
Italy	12.4	12.2	11.5	11.4	9.9	9.7
Netherlands	4.8	4.8	4.9	5.3	5.8	5.3
Austria	1.8	2.0	1.8	1.7	2.1	2.1
Portugal	0.4	0.4	0.4	0.4	0.3	0.3
Finland	2.4	2.3	1.9	1.8	1.9	1.9
Sweden	5.5	6.0	5.9	5.0	5.4	5.9
UK	13.7	14.5	16.8	15.2	14.4	13.5

Source: Allen 2002, p. 3

Table 2: Imports of EU member states from Japan (in %)

	1995	1996	1997	1998	1999	2000
Belg.-Lux.	6.6	6.3	5.9	6.0	6.9	6.1
Denmark	1.5	1.3	1.3	1.2	1.1	0.8
Germany	29.4	29.5	27.6	27.2	26.4	27.4
Greece	1.0	1.4	1.4	1.3	1.7	1.1
Spain	4.0	3.8	3.9	4.4	4.8	4.5
France	9.5	8.9	8.9	8.6	9.2	9.9
Ireland	2.2	2.3	3.3	3.2	2.9	2.6
Italy	6.3	6.0	6.2	6.4	7.2	7.5
Netherlands	10.3	12.0	12.1	12.9	12.8	13.1
Austria	1.6	1.6	1.3	1.3	1.4	1.4
Portugal	1.0	1.1	1.2	1.4	1.4	1.2
Finland	2.1	1.9	1.9	1.9	1.9	1.6
Sweden	3.2	2.9	3.1	2.6	3.0	3.2
UK	21.4	21.0	22.0	21.4	19.2	19.7

Source: Allen 2002, p. 2

The *trade balance* is an economic indicator well watched for political resons[1]. As for EU trade with Japan (table 3), the European deficit has considerably increased in recent years, from 21 billion ECU in 1995 to 41 billion euro in 2000. Germany and the UK have the largest trade deficits with Japan, and they**,** too, have increased in recent years. Together, both countries still account for about half of the total EU deficit with Japan. However, the most dynamic *increase* can be noticed elsewhere. The bilateral deficit of the Netherlands with Japan has become almost as large as that of Germany and the UK; France´s deficit with Japan, while still comparably small, has more than tripled since 1995.

---

[1] While we know from economic theory that a bilateral surplus or deficit is difficult to interpret and certainly does not simply indicate the strength or weakness of an economy vis-à-vis another, politicians still watch it carefully, and it is therefore an important source of information on potential policy problems.

Table 3: Bilateral balance of trade Japan-EU (in Mio. ECU/EUR)

	1995	1996	1997	1998	1999	2000
EU-15	-21,403	-16,787	-23,779	-34,475	-36,537	-41,121
Belg.-Lux.	-1,909	-1,384	-1 683	-2,395	-2,939	-2,867
Denmark	592	616	652	445	725	-1,219
Germany	-5,920	-4,428	-6,076	-8,667	-8,646	-10,348
Greece	-455	-652	-750	-817	-1,160	-833
Spain	-1,270	-1,120	-1,347	-2,006	-2,397	-2,628
France	-843	-407	-957	-1,480	-2,293	-3,003
Ireland	-184	-108	-542	-674	-192	985
Italy	640	1,245	439	-624	-1,649	-2,083
Netherlands	-4,005	-4,566	-5,499	-6,873	-7,172	-8,855
Austria	-274	-108	-137	-354	-229	-246
Portugal	-425	-458	-607	-825	-912	-941
Finland	-335	-164	-454	-677	-675	-525
Sweden	87	598	300	-160	-237	-98
UK	-7,100	-5,853	-7,118	-9,367	-8,758	-10,848

Source: Allen 2002, p. 3

As for explaining the growing deficit with Japan, imports from Japan have shown a continuous increase since 1995, while exports to Japan have risen only slightly. One factor has been Japan´s economic stagnation or at least sub-average growth rates in recent years, which has made it difficult to export more goods to Japan. Even in relative terms, though, the EU´s share of Japan´s imports declined from 14.5 percent in 1995 to 12.4 percent in 2000. Germany lost about 0.8 percentage point of Japan´s imports, thus accounting for almost half of the EU´s loss. In terms of European imports, there is some statistical evidence for a redirection of exports from crisis-stricken East Asia to Europe during 1998 and 1999, but following the recovery of the region and of Japan´s imports into it, the EU has almost returned to its former market share.

A policy issue may emerge in case a weakening Japanese Yen will lead to even more exports into the EU, while a continuing weakness of the economy might still put a lid on Japan´s imports, worsened by European products becoming more expensive due to the devaluation of the Yen. This would increase the EU´s trade deficit with Japan further, and given recent tendencies of Germany´s changing shares within the EU, Germany would be one of the principal economies affected. However, this has not become a policy issue yet and given the

small share of Japan´s goods among Germany´s imports, it is doubtful whether this would cast a shadow over bilateral relations.

3. Trade intensity

How are the bilateral trade flows between Japan and Germany to be interpreted in the context of both economies? For a preliminary answer, we calculated so-called single-relative trade intensities, i. e. related imports and exports to the overall import level and level of both countries. For any given year, we thus receive four percentage figures. Results for 1991 and 2000 are reported in table 4. All values are in the low single digit percentage figures, a rather disappointing performance for two of the world´s major economies. Even more striking, in all four cases trade intensity has declined over the last decade. However, we should not jump to any conclusions. One reason why it is difficult to interpret changes in (bilateral) trade is that such changes may be due to overall shifts in the trade patterns and not to specific issues in the bilateral context.

Table 4: Single-relative trade intensity between Japan and Germany (in %)

		1991	2000
Exports	Japan´s share among German exports	2.4	2.2
	Germany´s share among Japanese exports	6.6	4.2
Imports	Japan´s share among German imports	6.1	4.9
	Germany´s share among Japanese imports	4.5	3.4

Source: Own calculations, based on OECD foreign trade data

For more insights, we will follow the Savage-Deutsch approach (Savage/Deutsch 1960, Sautter 1983), by which a double-relative index of trade intensity can be measured. It compares the actual trade level from country X to Y with X´s overall inclination to export and with Y´s inclination to import; moreover, the general development of world trade is taken into account.

Given various limitations[2], we have operationalised the approach as follows: First, a probability for X (e. g., Germany) to export to Y (e. g., Japan) is calculated by multiplying

---

[2] OECD trade data were used instead of data on world trade, e. g. supplied by UNCTAD, because we could find more recent data from OECD. For consistency reasons, we have used export data throughout (see also the next

Germany´s share in overall exports within OECD with Japan´s share in overall imports within OECD[3]. This probability is multiplied with the overall level of trade within OECD, operationalised by the total export amount of OECD economies among themselves. Rearranging, this leads to:

$$\text{Estimate for export level from } X \text{ to } Y = \frac{\text{Exports from } X \text{ to OECD} * \text{Exports from OECD to } Y}{\text{All exports among OECD economies}}$$

The actual export level from X to Y is divided by this estimate and can be interpreted as an indicator of trade-intensity:

$$\text{Double - relative trade intensity from } X \text{ to } Y = \frac{\text{Actual exports from } X \text{ to } Y}{\text{Estimate for export level from } X \text{ to } Y}$$

If its value is larger than one, actual trade is larger than the estimate, i.e. more trade takes place than would be expected from the trade patterns of the two economies concerned and given a certain situation of world (or OECD) trade. If the value is smaller than one, there is less trade than might be expected.

Data for German exports throughout the 1990s is presented in table 5. As expected, the double-relative trade intensity from Germany to Japan is well below one, i. e. the actual values are more than a third lower than should be expected from German and Japanese trade patterns. It may be somewhat encouraging, though, that despite the progress of European integration and Japan´s strong links within the Asian region, at least trade intensity from Germany to Japan did not decline during the 1990s.

---

footnote). We have done some calculations using import data only and have found no significant difference with respect to the results of export-based calculations. Calculating the probablility is based on the assumption that X´s propensity to export is independent of Y´s propensity to import. Moreover, in principal there should be a correction of the estimated probabilities due to the fact that no country can trade with itself; however, given the rather large number of participating economies and because we are interested in changes over time, not so much in the estimated levels itself, we did without such minor corrections.

[3] In order to keep the data consistent, we used export data for calculating the imports into Japan, i. e. exports from all OECD economies to Japan were divided by the sum of all OECD exports to other OECD economies.

Table 5: Double-relative trade intensity of German exports with major trading partners

Partner	1991	1994	1997	2000
Japan	0.59	0.59	0.57	0.59
USA	0.49	0.49	0.53	0.52
UK	1.14	1.23	1.26	1.27
Netherlands	1.67	1.72	1.55	1.49
France	1.65	1.74	1.64	1.79

Source: Own calculations, based on OECD foreign trade data
For an explanation of double-relative trade intensity, see text

It should be helpful to evaluate Japan´s position among Germany´s export partners in relation to other major developed economies. Such data is also provided in the table. As expected, Germany´s export intensity with leading EU economies is high and is indeed still rising further. However, with respect to the US, exports to Japan do not compare badly. Actually, the intensity values for exports to the US are lower than for Japan, although the gap is narrowing slowly. Exports to the US are large in absolute terms due to the vast size of the US economy and its import levels (as well as its trade deficit), while an intensity measure shows that in relative terms German exports to the US are not so impressive, for instance, when compared to exports to the world´s second largest economy, Japan.

As is the case with Germany´s exports to Japan, Japanese exports to Germany also have an intensity level of less than one (table 6). Apart from the strong 1991 figure (to some extent due to strong auto sales in the post-unification phase), values are around 0.6 with some evidence for a slow increase.

Table 6: Double-relative trade intensity of Japanese exports with major trading partners

Partner	1991	1994	1997	2000
Germany	0.72	0.59	0.62	0.64
USA	2.99	2.66	2.54	2.20
UK	0.69	0.70	0.71	0.68
Netherlands	0.61	0.68	0.77	0.91
France	0.32	0.27	0.31	0.35

Source: Own calculations, based on OECD foreign trade data

Comparing the bilateral Japanese-German export intensity with Japan´s exports to other major economies, Japan´s strong reliance on the US market is evident. Still, it should be noted that this dependence notably decreased from 3.0 to 2.2 during the 1991-2000 period, whereas there is no such deterioration with respect to trade with the world´s third largest economy, Germany. Looking at trade data for other major European economies, Germany holds a respectable middle place, similar to the UK and much larger than France. For all EU countries considered, the value is below one. The Netherlands occupies a very strong position, having moved beyond 0.9 in 2000, but it is not clear to what extent this is due to Japanese exports just passing through Dutch ports and going on to other final destinations.

4. Bilateral trade by industrial sector

It is frequently argued that German-Japanese trade relations show a peculiar pattern of industrial sectors involved, pointing towards certain problems. For instance, it is often said that German final consumer goods, such as leather products, apparel, processed foods and beverages, for example, are not to be found in the Japanese market; this is often combined with the advice to German firms in this sector to try harder.

In table 7, some raw data on principal German exports to Japan is presented. The strongest export items are machinery, road vehicles (mainly cars) and pharmaceutical/cosmetic products. Indeed, consumption goods (defined here as goods belonging to SITC category 8[4]) only amounted to 11 percent of German exports to Japan in 2000, hardly up from 10 percent in 1991.

---

[4] SITC category 8 is formally labelled „miscellaneous manufactured products" and includes sanitary, furniture, travel goods, handbags, apparel, footwear, photographic apparatus, and watches, among others. Thus, it can be regarded as an acceptable proxy for (miscellaneous) consumer goods.

Table 7: German exports to Japan; major industries

(in 1000 US Dollars)

Industries	1991	1994	1997	2000
Food, Beverages, Oils	201,140	312,169	299,175	251,421
Crude materials, Fuels	62,140	102,458	95,858	81,178
Chemicals	1,065,582	1,255,963	1,269,115	1,589,548
Pharmaceutical, Cosmetic products	779,320	1,021,992	782,243	810,333
Manufactured goods	703,357	613,190	751,074	840,906
Machinery	2,240,838	2,123,565	2,718,246	2,971,355
Road vehicles	3,600,263	4,133,277	4,129,875	3,986,542
Misc. consumer goods	953,647	1,144,190	1,337,507	1,313,510
Total	9,629,672	10,724,056	11,386,682	11,850,122

Source: Own calculations, based on OECD foreign trade data
Figures do not add up to total, because SITC 9 was omitted.

Explanation of industries:

"Food, Beverages, Oils": SITC 0 ("Food and live animals") + SITC 1 ("Beverages and Tobacco") + SITC 4 ("Animal and vegetable oils, fats and waxes")

"Crude materials, Fuels": SITC 2 ("Crude materials, inedible, except fuels") + SITC 3 ("Mineral fuels, lubricants and related materials")

"Chemicals": SITC 5 ("Chemicals and related products") - [SITC 54 ("Medical and pharmaceutical products") + SITC55 ("Essential oils and resinoids and perfume material, toilet and cleaning preparations) ")]

"Pharmaceutical, Cosmetic products": SITC 54 ("Medical and pharmaceutical products") + SITC55 ("Essential oils and resinoids and perfume material, toilet and cleaning preparations) ")

"Manufactured goods": SITC 6 ("Manufactured goods classified chiefly by material")

"Machinery": SITC 7 ("Machinery and transport equipment - SITC 78 ("Road vehicles (including air-cushion vehicles) ")

"Road vehicles": SITC 78 ("Road vehicles (including air-cushion vehicles) ")

"Misc. consumer goods": SITC 8 ("Miscellaneous manufactured articles"). See footnote 4.

SITC according to Standard Industrial Trade Classification, Revision 3

Such simple empirical evidence is hardly satisfactory, though, because it tells little about whether an emerging pattern is peculiar to trade with Japan or a general aspect of German external economic relations. To learn more, the concept of the revealed comparative advantage (RCA) as developed by Balassa (1965) is helpful. A bilateral RCA is defined as

$$\text{Bilateral } RCA_{ijs} = \frac{\dfrac{\text{Exports of } s \text{ from } i \text{ to } j}{\text{All exports from } i \text{ to } j}}{\dfrac{\text{All exports of } s \text{ from } i}{\text{All exports from } i}}$$

where *i* (exporter) and *j* (importer) are countries and *s* is an (industrial) sector.

The bilateral RCA compares to what extent an exporting country`s specialisation in its overall trade of industry *s* goods is similar in its trade with a particular importing country *j*. For instance, if machinery makes up 20 percent of *i*´s trade with *j* (the numerator in the formula above), but only 10 percent in its overall trade (the denominator), then good *s* enjoys a certain comparative advantage in *i*´s exports to *j*.The bilateral RCA´s value in this case is 2 (namely 20 %/10 %) and emphasizes this very fact. Obviously, the critical level of the indicator is 1. If the sectoral RCA is higher, it denotes a specialization, if it is lower, it reveals a comparative disadvantage.

The concept has some particular strengths. For instance, it is consistent with Ricardo´s finding that there is no absolute trade advantage or disadvantage, but only a relative one in comparison with other goods or sectors. Moreover, an RCA is independent of size and overall trade surplus/deficit situations. However, there is also a price to be paid: the RCA only covers actual performance and does not contain information on the reasons behind the realised exports; strictly speaking, it does not denote "true" competitiveness, because a high RCA may be due to subsidies, for instance.

With these considerations in mind, table 8 contains RCA values for German exports to Japan. Surprisingly, the bilateral RCA for consumption goods was only slightly below unity in the early 1990s and has since risen above 1. The presumed weakness of the consumption goods sector is not a peculiar feature of German trade with Japan according to this calculation, but is a problem of German trade in general. True enough, if one compares the limited presence of major German brands in Japan, such as Montblanc fountain pens or Goldpfeil leather products with the prevalence of the likes of Louis Vuitton, Burberry or Gucci, the impression one may be getting is that this signifies a peculiar business weakness. However, such a view cannot be supported when taking the overall German trade pattern into account. It is thus doubtful whether this aspect should really be a major issue for bilateral business or policy fora. At least, more detailed and convincing evidence will have to be presented to make such a case.

Table 8: Revealed comparative advantage (RCA) for German exports to Japan

Industries	1991	1994	1997	2000
Food, Beverages, Oils	0.40	0.55	0.54	0.60
Crude materials, Fuels	0.40	0.55	0.54	0.60
Chemicals	1.07	1.11	1.09	1.42
Pharmaceutical, Cosmetic products	0.84	0.93	0.92	1.20
Manufactured goods	0.43	0.35	0.43	0.51
Machinery	0.69	0.60	0.71	0.74
Road vehicles	2.43	2.39	2.16	1.94
Misc. consumer goods	0.89	1.02	1.19	1.18

Source: Own calculations, based on OECD foreign trade data
For industries, see table 7; for RCA, see text

Interestingly, other sectors are also full of surprises. While machinery products (ex transport vehicles), a renowned industrial branch run by German *Mittelstand* (small and medium) entrepreneurs, belong indeed to one of the biggest export sectors in bilateral trade with Japan, contributing a volume of some two billion dollars in 2000, its bilateral RCA was consistently below unity during the 1990s. This could be interpreted as evidence for the often proclaimed structural weakness of German small and medium enterprises to reach out to distant markets.

Looking for the highest bilateral RCAs, road vehicles, i. e. mainly passenger cars, occupy as expected – top rank. German companies were not able to improve their relative position throughout the 90s though, but showed a decline from 2.4 in 1991 to 1.9 in 2000, still well above 1, though. As for significant positive developments, chemical products and pharmaceutical/cosmetic products in particular could improve their standing beyond the unity level. On the negative side, raw materials as well as intermediate products made of various materials as well as the agricultural sector, including food and beverages are particularly weak, which comes as no surprise.

A similar analysis can be undertaken for *Japan´s exports to Germany*. Using the same classification of industrial sectors as before, table 9 shows that machinery products (ex road vehicles) clearly dominate trade flows. Road vehicles, which means mainly passenger cars, and consumer goods of SITC category 8 are other strong export sectors.

Table 9: Japanese exports to Germany; major industries

(in 1000 US Dollars)

Industries	1991	1994	1997	2000
Food, Beverages, Oils	32,566	29,193	14,788	16,174
Crude materials, Fuels	78,600	74,980	68,209	97,844
Chemicals	741,603	763,167	804,196	762,619
Pharmaceutical, Cosmetic products	113,143	162,032	200,063	135,810
Manufactured goods	988,851	866,586	870,181	1,021,906
Machinery	10,340,561	9,522,559	9,724,651	11,665,703
Road vehicles	5,504,953	4,136,487	3,871,955	2,865,295
Misc. consumer goods	2,657,340	2,108,997	2,114,522	2,455,476
Japanese Exports to Germany	20,619,945	17,908,830	17,998,663	19,994,733

Source: Own calculations, based on OECD foreign trade data
For industries, see table 7; figures do not add up due to omissions

Turning to the performance of these sectors in relation to Japan´s overall trade patterns, i. e. employing RCA analysis (table 10), it turns out that in its strongest sectors with respect to trade with Germany, namely SITC categories 7 (machinary) and 8 (misc. Consumer goods), these exports rather closely resemble Japan´s overall export pattern, i. e. being rather close to unity. Despite the strength of Japan´s automobile industry, its bilateral RCA with Germany declined from 1.2 to 0.8 between 1991 and 2000; however, this can be explained by the many Japanese cars now entering Germany from production facilities within the EU. Other machinery products as well as category 8 consumption goods reveal relative strength, but do not seem to overly target the German market; there is only a small RCA increase for machinery items and an actual slight decline for consumer goods. Although pharmaceuticals/cosmetics showed some strength before, the 2000 figures are below unity. As expected, the more upstream sectors are weak, while there is some positive development for processed foods and beverages.

Table 10: Revealed comparative advantage (RCA) for Japanese exports to Germany

Industries	1991	1994	1997	2000
Food, Beverages, Oils	0.27	0.31	0.15	0.18
Crude materials, Fuels	0.36	0.34	0.32	0.49
Chemicals	0.72	0.79	0.70	0.59
Pharmaceutical, Cosmetic products	1.00	1.50	1.61	0.83
Manufactured goods	0.41	0.45	0.44	0.52
Machinery	1.03	1.03	1.07	1.16
Road vehicles	1.19	1.14	1.14	0.78
Misc. consumer goods	1.51	1.53	1.40	1.36

Source: Own Calculations, based on OECD foreign trade data
For industries, see table 7; for RCA, see text

Summing up the findings from RCA analysis, among German exports the relative strength of road vehicles stands out, while despite their impressive absolute volume other machinery products are somewhat weak. Consumer goods (here defined as SITC category 8) are stronger than is frequently presumed. This last finding holds even more if pharmaceutical/cosmetic products and road vehicles, mainly passenger cars, are also understood as consumer items. As for Japan, there is little evidence of a particular "targeting" policy with respect to Germany. Road vehicle exports even show an RCA weakness, because such exports have been substituted by deliveries from other, mainly European, production bases.

5. Intra-industry trade

Another way to look at sectoral patterns of trade is to study the presence of intra-industry trade. Since Grubel´s and Lloyd´s pathbreaking study (1975), intra-industry trade is understood as an important indicator of economic integration between economies. Changes and sectoral differences can point to business problems and potential trade friction.

A superficial glimpse at trade data suggests that Germany and Japan have similar strengths in their bilateral trade, with motor cars and other machinery products ranking high in each other´s shopping list. However, based on such crude data it is difficult to compare bilateral trade to overall trade patterns and to characterise its development.

For a more careful analysis, the so-called Grubel-Lloyd index of intra-industry trade in sector *s* (IITs) can be calculated as:

$$ \mathrm{ITT}s = \left[1 - \frac{|\mathrm{X}s - \mathrm{M}s|}{\mathrm{X}s + \mathrm{M}s} \right] \times 100 $$

where *Xs* and *Ms* denote exports and imports of the respective sector or good. The index shows the extent of exports and imports having a similar or different level, controlling the size of trade, namely exports plus imports. If exports and imports are the same, i. e. in case of a maximum intra-industry trade interaction, the numerator will be zero and the index 100. In case there is no intra-industry integration at all, i. e. either exports or imports are zero, the fraction will be one and therefore the index zero. For all interpretations it should be noted that the Grubel-Lloyd index is sensitive in two respects. First, its values depend on the distinction being made as regards the number of sectors. The higher the number of sectors, the less intra-industry trade will show up; moreover, if one compares a country´s intra-industry trade with that of another country and that of a world region, the index for the latter will often tend to be bigger. A second point is that index values are affected by the presence of (bilateral) trade surpluses or deficits; in a surplus country, for instance, index values for at least some industries must be quite low, because there are just not enough imports to more or less balance exports in all sectors.

Figure 3 presents data for German-Japanese intra-industry trade (IIT), based on the sectoral distinction used in RCA analysis. Some IIT index values are quite high, for instance in agricultural and in intermediate products as well as in road vehicles. More interestingly, IIT values for a couple of leading sectors in bilateral trade are quite low: this holds for machinery products as well as for pharmaceutical/cosmetic products. In the first case, while machinery is also a strong German export item, it is overwhelmed by imports from Japan, particularly in electrical products. In the latter, Japanese industry has little to compensate German successes in pharmaceutical products. IIT in consumption goods (SITC 8) is also quite low, as Japan´s exports are significantly larger than Germany´s.

Figure 3: Intra-industry trade between Japan and Germany
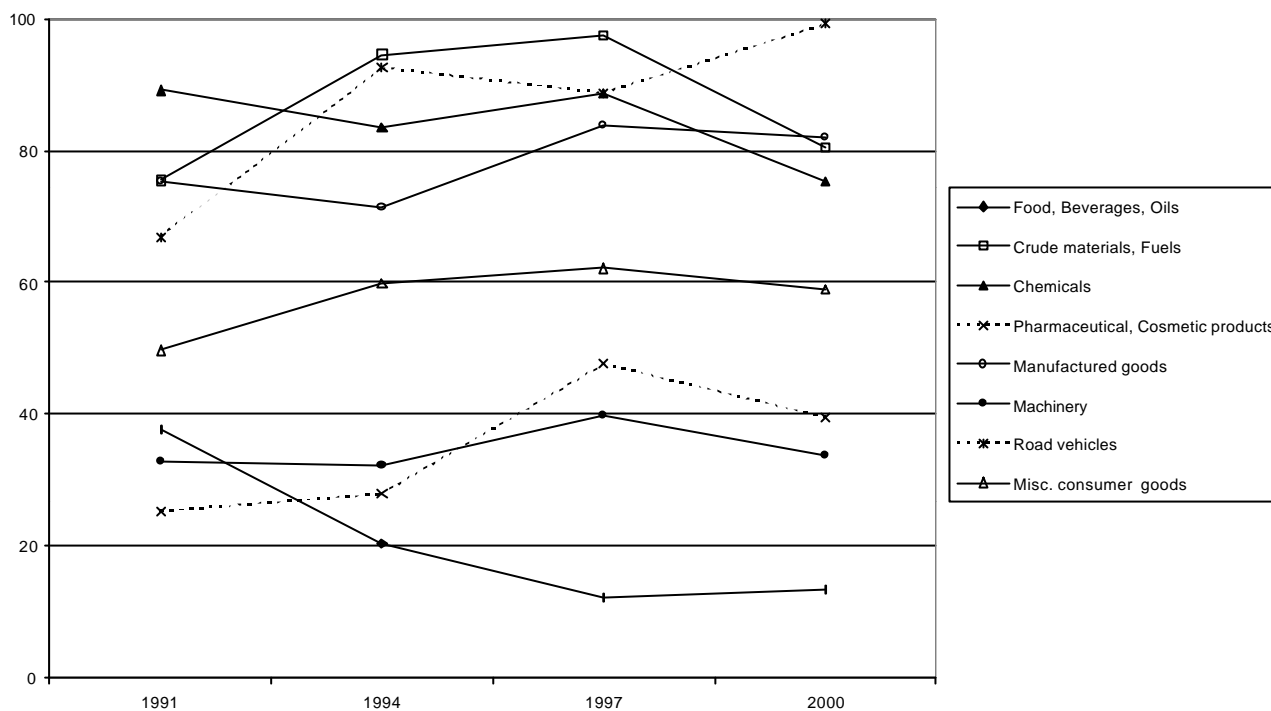
Source: Based on OECD foreign trade data; own calculations
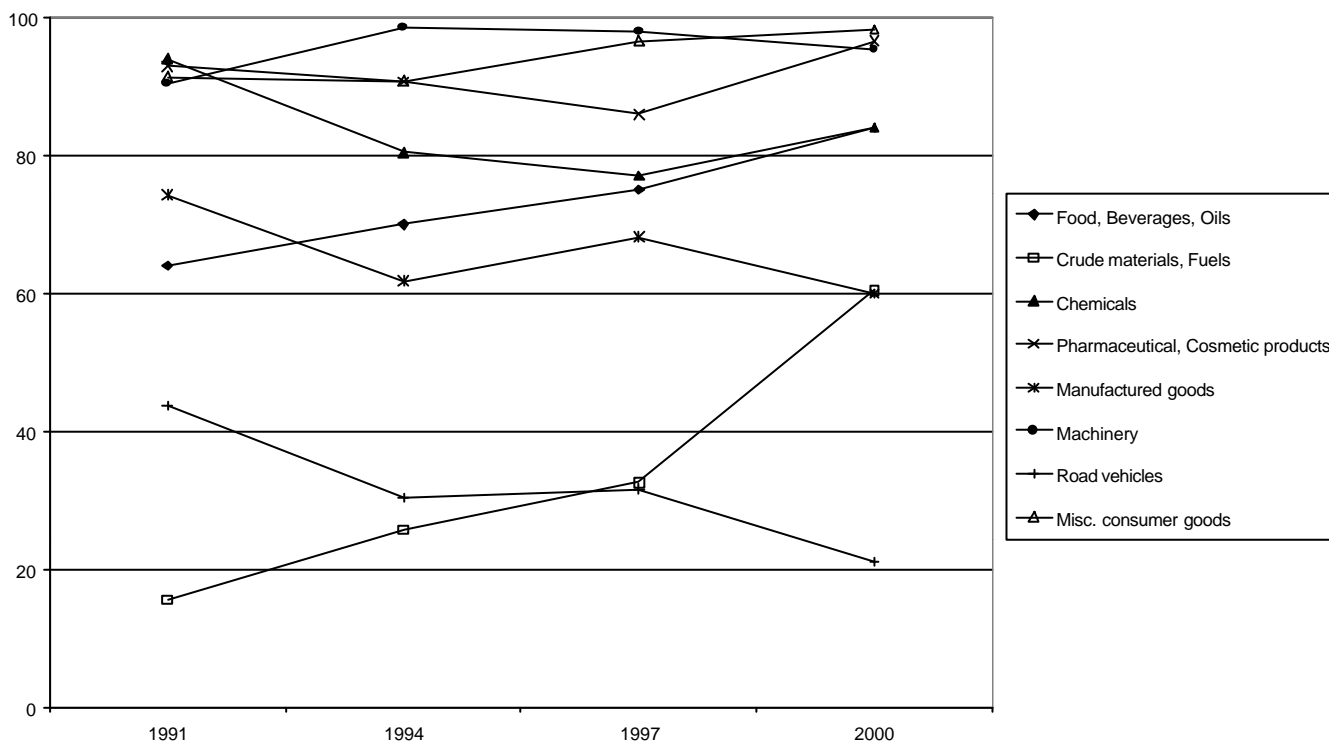For industries, see table 7

During the 1990s, there was no consistent trend of closer economic integration between the two countries; in the latter 1990s, there is even some decline. Some IIT values have indeed increased. Arguably, road vehicles is the most important one among those. However, this is not due to an increased bilateral interaction, but to a substitution effect of Japanese cars now being exported from Europe; because of this, Japanese exports have decreased to a level similar to German exports to Japan. For chemicals, there is actually a decline, for machinery (ex road vehicles) more or less stagnation.

How does this compare with the overall German trade pattern? Taking Germany´s trade with its major partners EU15 and US (figure 4) as well as the world in general as a point of departure, it is clear that economic interdependence with Japan as measured with IIT is lower in most sectors, at least the important ones. One important exception is road vehicles, where Germany is a notable net exporter with almost all major countries, whereas the high IIT index in its trade with Japan is somewhat distorted. The most important finding is, though, that there is no clear tendency for IIT between Germany and Japan having reached similar levels to interaction with the EU or the US during the 1990s.

Taking Japanese patterns as a point of departure, Japan´s trade with the US (figure 5) or with EU15 is more intra-industry intensive than with Germany in the major industries, the principle exception, again, being road vehicles.

Summing up, the intra-industry trade between Japan and Germany is not as high as is usually perceived when comparing the major bilateral export activites. There is still room for further increase, when comparisons with other major trading partners are taken as benchmarks. However, it should be stressed that these findings should be supported by an IIT analysis based on a more differentiated analysis of industrial branches.

Figure 4: Intra-industry trade between the US and Germany

Source: Based on OECD foreign trade data; own calculations
For industries, see table 7

Figure 5: Intra-industry-trade between the US and Japan
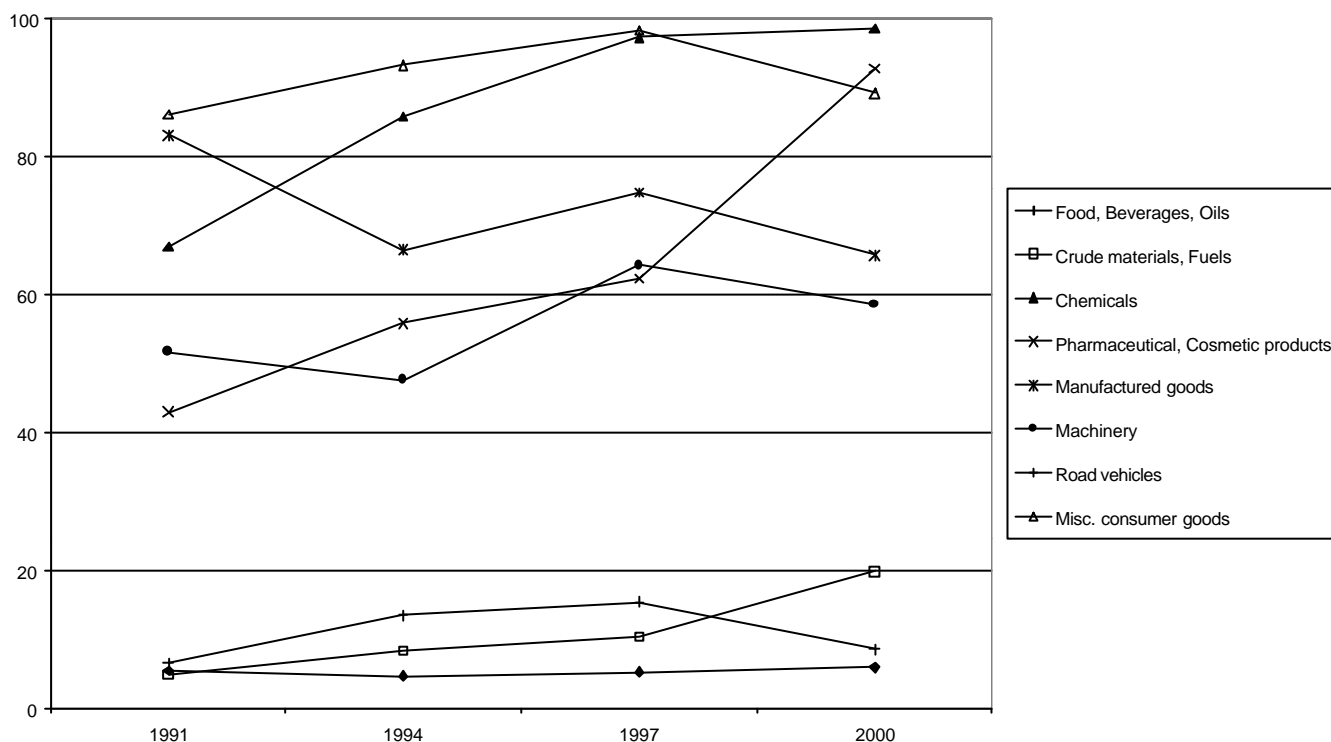
Source: Based on OECD foreign trade data; own calculations
For industries, see table 7

6. Direct investment relations

An analysis of bilateral business relations should not solely focus on trade, but should take
into account foreign direct investment (FDI). FDI as compared to so-called portfolio
investment is understood to be an expression of a lasting interest in a foreign enterprise.
According to the recommendations by the OECD, an ownership share of 10 percent or more
is evidence of such an interest. As can easily be appreciated from these facts, the way in
which FDI is defined and counted is critical for any meaningful analysis of available

information. Owing to data limitations, we feel unable to perform a meaningful analysis with industry-level figures at this stage.

Figure 6 gives a basic overview of German-Japanese FDI relations in recent years based on stock data. As for German investment in Japan, there has been a notable increase in the late 1990s, following various Japanese deregulation and market opening measures (for more detailed information, see DIHKJ 1999, Bromann et al. 2000). As for Japan, it already owned a considerable stock of FDI in Germany around 1990. During the 1990s, there was hardly any further increase; rather, a couple of consolidation measures among existing investments took place (more details in GfW 2000).

Figure 6: Foreign direct investment (FDI) between Germany and Japan

(in 1000 Mill. EUR, End-of-Year Levels)
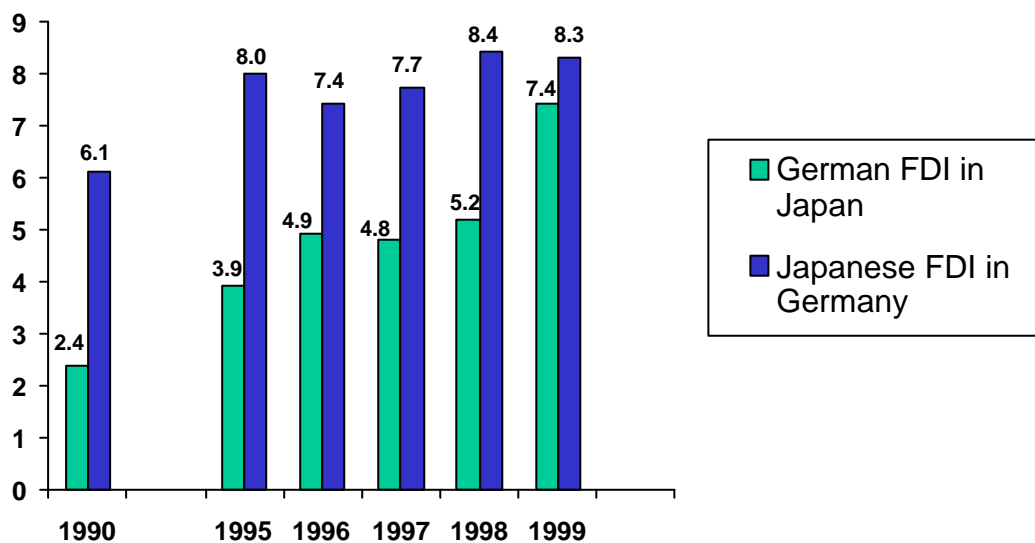
Source: Deutsche Bundesbank (German Central Bank) data

To continue the analysis, we present some data putting Japanese-German FDI relations in the context of Europe and other world regions, now working with flow data (table 11).

Table 11: Japanese FDI outflow and inflow in 2000 (1 April 2000 – 31 March 2001)

Values in mio. US Dollars (based on 1 US dollar = 110.52 yen), shares in percent

	Outflow	Outflow share	Inflow	Inflow share
USA	12,136	25.0	9,141	32.3
Latin America ex Cayman Islands	2,496	5.1	327	1.2
4 Asian NIEs	2,682	5.5	372	1.3
ASEAN4	2,035	4.2	1	0.0
China	995	2.0	5	0.0
EU	23,909	49.2	4,267	15.1
(France)	(325)	(0.7)	(n.a.)	(0.9)
(Germany)	(320)	(0.7)	(2,530)	(8.9)
(Netherlands)	(2,757)	(5.7)	(468)	(1.7)
(U.K.)	(19,142)	(39.4)	(506)	(1.8)
Other Europe (ex EU)	497	1.0	1,967	7.0
Oceania	667	1.4	62	0.2
Foreign firms already in Japan	--	--	10,326	36.5
TOTAL	48,580	100.0	28,276	100.0

Source: JETRO 2002, pp. 18 and 24, some recalculations by the author
Notes: Based on Ministry of Finance (Japan) notification data.
            Shares do not add up to 100 percent, because some areas are not reported here.

As for outflowing Japanese investment, the EU´s position was very strong in 2000; almost half of Japan´s FDI was headed there. The U. K. and the Netherlands were the most important destinations, with Germany collecting less than 1 percent of FDI outflow. While this seems an encouraging number, at least from a European, if not necessarily from a German point of view, the figures have to be interpreted extremely carefully. The main reason is that they also include investment into merger and acquisition (M&A) activities, which have risen significantly in recent years. According to KPMG´s dealwatch database, OECD economies moved around more than 700 billion US dollars in 1999, with Japan contributing about 20 billion and receiving about 16 billion US dollars (Miyake/Sass 2000, p. 31). A few major deals can thus significantly influence the level of bilateral FDI flows in any one year. As for the 2000 data, prepared on the basis of the Japanese Ministry of Finance notification files, outflow to Britain is overstated, because some major investment by NTT DoCoMo was ultimately targeted at the US (JETRO 2002, p. 16).

Also, the number for the Netherlands cannot be taken at face value. A significant proportion seems to have gone into setting up holding companies for European operations as a result of

attractive taxation schemes offered by the Dutch government. This is a frequently heard suggestion and can be supported empirically by comparing the bilateral Japanese FDI outflow data with the Dutch FDI inflow data, which excludes intermediate holding companies (Special Financial Institutions) (OECD 2000, p. 453). There has been a huge discrepancy between both time series in recent years. For instance, according to Japanese sources, in 1998 Japan invested some 2 billion US dollars in the Netherlands, while the amount stated in Dutch data was 431 million US dollars. For 1999 the difference was even larger, but in that case it was distorted by Japanese M&A in the telecom market. Despite these factors, it cannot, however, be ruled out that the Netherlands has indeed become a more attractive FDI location for Japanese companies than Germany. In order to diminish the influence of major M&A deals and holding companies somewhat, we have compared the number of FDI cases as well, irrespective of their volume[5]. To achieve comparability, we have used Japanese data. In 2000, the leading destinations within the EU were as follows: Netherlands 305, U.K. 281, Luxembourg 43, Germany 29, France 13. Disregarding the special case of Luxembourg (banking), the Dutch and the British economies clearly stand out as major destinations, with Germany reaching only a tenth of their number of cases.

As for other parts of Europe, Central and Eastern Europe (CEE) have recently become notable destinations. This is in line with a frequently heard suggestion that Japanese subsidiaries in Germany had been important in servicing CEE markets for many years, while more recently there has been a shift towards setting up subsidiaries there directly.

We now turn to *Japanese inflows*. FDI headed for Japan as one of the most advanced countries is still dominated by companies from other advanced OECD economies (table 12). Even neighbouring Pacific Asian nations have hardly made any significant inroads. The EU occupies a strong no. 2 spot behind the USA, with the "Other Europe" category almost entirely filled by Switzerland. Again, one has to be careful in not overinterpreting the data which contain major M&A deals. In the first half of fiscal year 2001, for instance, the EU accounted for some 58 percent of Japanese FDI inflows and the US "only" for some 29 percent. Germany is certainly one of the stronger investors in Japan, while the 2000 data reported above are somewhat out of proportion because of the voluminous DaimlerChrysler-Mitsubishi deal.

---

[5] It is assumed that a few major deals do not affect those figures significantly. Also, as the number of conglomerates and company networks is rather limited, the number of holding company cases involved in the whole number of cases should be rather small, not amounting to several hundred cases.

7. Relative intensity of bilateral FDI

As with respect to the trade figures, we now construct single-relative measures of FDI intensity, i. e. looking at the actual FDI flows in relation to the overall FDI outflows *or* inflows, and with respect to the investing *or* receiving country. To account for the wide fluctuation of annual FDI flows, we used averages for the 1990-92 period and compared them to 1997-99[6]. According to the results presented in Table 12, the shares both countries occupy in each other´s FDI activities – the single-relative intensities - are in general even lower than in their trade profiles (table 4 above). Also, as with respect to trade, they have further declined in recent years, to levels between 0.5 and 3 percent. The only notably high figure is Japan´s share of 22 percent in Germany´s incoming FDI of 1990-92, which is primarily due to Japan preparing for the European Common Market.

Table 12: Single-relative FDI intensity between Japan and Germany (in %)

		1990-92	1997-99
Outflows	Japan´s share among German FDI outflows	1.4	0.5
	Germany´s share among Japanese FDI outflows	2.4	1.2
Inflows	Japan´s share among German FDI inflows	22.5	1.5
	Germany´s share among Japanese FDI inflows	5.0	3.0

Source: Own Calculations, based on OECD FDI data

For a more thorough analysis, we compare actual FDI flows between Japan and Germany to the overall inclination of both economies to engage in FDI activities, taking the global trend of FDI into account. This so-called double-relative measure is constructed in a similar way as the intensity measure introduced in the section on bilateral trade, so that one arrives at the following :

$$\text{Estimate for FDI flow from } X \text{ to } Y = \frac{\text{FDI outflows from } X \times \text{FDI inflows into } Y}{\text{All global FDI flows}}$$

The actual FDI level from *X* to *Y* is divided by this estimate and can be interpreted as an indicator of FDI-intensity among the two economies involved:

---

[6] Unfortunately, more up-to-date data was not available on a consistent basis.

$$\text{Double - relative FDI intensity from } X \text{ to } Y = \frac{\text{Actual FDI flow from } X \text{ to } Y}{\text{Estimate for FDI flow from } X \text{ to } Y}$$

The actual calculation is complicated by the fact that FDI data are much more difficult to handle than trade figures. We already noted the problem of defining and counting FDI, which is particularly tricky when data from different sources is involved. Also, flows can change significantly from year to year as mentioned before. To account for the latter problem, we again calculated averages for the 1990 to 1992 period and compared them to the 1997 to 1999 average, thus eliminating single-year peaks and troughs. As for the first problem, we did the estimations with the "actual FDI flow from *X* to *Y*" not only with outflow data from *X*, but also with inflow data from *Y*, looking for problematic differences. While the continuous efforts of OECD have enabled us to do this calculation at all, it should be stressed that the data basis is still somewhat problematic and that results should not be overinterpreted. Rather, they can help to develop meaningful ideas and hypotheses for further research.

Results are presented in table 13 - and they look quite dramatic. While in the early 1990s the intensity of investment relations between Germany and Japan was quite strong, it has significantly weakened in recent years. In 1990-92, Japan took a keen interest in the European Common Market project and Germany was a principal location chosen to circumvent possible barriers. This is reflected in the fact that the actual FDI flow from Japan to Germany was about 50 percent higher than was to be expected from the overall structural factors.

Table 13: Double-relative FDI intensity between Germany and Japan

	1990-92	1997-99
Japan´s FDI outflow to Germany	1.51	0.32
Germany´s FDI outflow to Japan	0.74	0.31

Source: Own Calculations; based on OECD FDI data for bilateral FDI flows and UNCTAD data for global FDI flows

At the end of the decade, both intensity measures declined well below the unity level. Several reasons can be put forward for the significant decline. First, we should repeat that values fluctuate widely between years. For instance, due to the Daimler-Mitsubishi deal German investment in Japan in 2000 was much bigger than in 1999. Would the two values have been

the other way round, the double-intensity index for German FDI in Japan would have been around 0.8 instead of 0.3 – still below unity, though. There are more structural reasons for the decline of intensity as well. One factor frequently mentioned is that both countries are "early starters" in each other´s investment market and are now concentrating on other pastures. For Japan, for instance, Germany was an early outpost in Europe when its companies could not afford to be present everywhere, but now that Japan has become richer and other markets have started to catch up, Japan is engaged in secondary investments all over Europe in a kind of "cascade approach". However, this view is but a euphemism for the observation that dynamism in international economic relations has shifted away from the German-Japanese link to other promising options still untapped. Public and business attention is not concentrated on what has been achieved in the past, but on the new challenges lying elsewhere.

Another factor is that both economies are considered to possess insider-oriented corporate governance schemes. This implies that it is difficult for outsiders or even foreign enterprises to gain a foothold in the other market by acquiring another company there. As expected, FDI between Japan and Germany were thus not a major locus for the M&A boom of the late 1990s; Japanese and German enterprises, to the extent that they did engage in that boom, rather chose engagements elsewhere. The often proclaimed similarity of the German and Japanese governance systems (Dore 2000, for example) thus had the paradoxical effect that both countries sought M&A chances elsewhere – a number of notable exceptions notwithstanding.

8. Conclusions

Bilateral economic relations between Japan and Germany have been the focus of this paper. Several quantitative indicators were calculated and basically support the view that trade as well as foreign direct investment links between both countries are rather weak. Nevertheless, a number of encouraging facts do emerge: for instance, while trade intensity between Germany and Japan is low in both directions, it has *not* declined in recent years. Germany´s trade intensity with the US is *lower* than with Japan, and Japan´s trade intensity is declining vis-à-vis the US, *not* vis-à-vis Germany. It is evident that there can be significant bilateral exchange when chances present themselves. For instance, when Japan´s companies prepared

for the European Common Market, more than 20 percent of German FDI inflow in 1990-92 originated from Japan. Also, competitive industries or companies have made significant inroads into each other´s market; consumer goods, for instance, may not be one of Germany´s major industries, but a peculiar weakness vis-à-vis Japan cannot readily be supported by the evidence presented. Still, the rather low levels of economic interchange show that new challenges for active enterprises are rather sought elsewhere in the world. It depends on the two economies overcoming their current weaknesses and regaining their dynamism, whether *bilateral* economic relations will (again) become more dynamic as well.

Finally, it should be noted that this paper could only tackle a few approaches of empirical research to gain a better understanding of German-Japanese bilateral economic relations. Given the importance of this relationship and the lack of studies undertaken so far, more work should be encouraged. For instance, using more detailed industrial demarcations should prove meaningful. Also, it should be studied to what extent bilateral (trade) links reflect the resource endowments of both economies and how they react to exchange rate fluctuation. However, this will have to be left to future research.

Sources

Balassa, B. (1965) Trade Liberalization and "Revealed Comparative Advantage", in: The Manchester School of Economics and Social Studies, Vol. 33

Bromann, S./W. Pascha/G. Philipsenburg (2000) Marktzugang für deutsche Unternehmen in Japan: Neue Chancen und Risiken, in: M. Pohl (ed.) Japan 1999/2000, Institut für Asienkunde, Hamburg, pp. 187-212

DIHKJ (Deutsche Industrie- und Handelskammer in Japan; German Chamber of Industry and Commerce in Japan) (1999) German Business in Japan, 9th edition, Tokyo: DIHKJ

Dore, R. (2000) Stock Market Capitalism: Welfare Capitalism. Japan and Germany versus the Anglo-Saxons, Oxford: Oxford University Press

GfW (Gesellschaft für Wirtschaftsförderung NRW; Economic Development Corp. of Northrine-Westphalia) (2000) (Authors: W. Pascha, W. Flüchter et al.): Japanische Unternehmen in der Bundesrepublik Deutschland: Eine empirische Untersuchung, Düsseldorf: GfW, Japanese translation: Doitsu ni okeru Nihon kigyou, Düsseldorf/Tokyo

Grubel, H. G./P.J.Lloyd (1975) Intra-Industry Trade. The Theory and Measurement of International Trade in Differentiated Products, New York: Wiley 1975

JETRO (Japan External Trade Organization) (2002) JETRO White Paper on Foreign Direct Investment (Summary), Tokyo

Kreft, H. (1994) Die deutsch-japanischen Wirtschaftsbeziehungen, in: H. J. Mayer/M. Pohl (eds.) Länderbericht Japan, Bonn: Bundeszentrale für politische Bildung, pp. 384-394

Laumer, H. (1998) German Enterprises in Japan and Japanese Enterprises in Germany – Competitors and Partners, in: ifo Digest, vol. 21, No. 1, pp. 17-23

Miyake, M. and M. Sass (2000) Recent Trends in Foreign Direct Investment, in: Financial Market Trends, No. 76, June, Organisation for Economic Co-operation and Development (OECD), Paris

OECD (Organisation for Economic Co-operation and Development) Foreign Trade by Commodities, Paris, various years

OECD (Organisation for Economic Co-operation and Development) International Direct Investment Statistics Yearbook, Paris, various years

Savage, I.R./K.W. Deutsch (1960) A Statistical Model for the Gross Analysis of Transaction Flows, in: Econometrica, 28, pp. 551-572

Sautter, H. (1983) Regionalisierung und komparative Vorteile im internationalen Handel, Tübingen: J.C.B. Mohr (Paul Siebeck)

UNCTAD (United Nations Conference on Trade and Development) (1996) World Investment Report. Investment, Trade and International Policy Arrangements. New York und Genua: United Nations

UNCTAD (United Nations Conference on Trade and Development) (2001) World Investment Report. Promoting Linkages. New York und Genua: United Nations