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The International Use of Main Currencies

A Statistical Overview of Recent Developments

by

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List of abbreviations

Aus	Australia
BIS	Bank of International settlements
BUBA	Deutsche Bundesbank
BdF	Banque de France
BdI	Banca d'Italia
Can	Canada
DM	Deutsche Mark
DNB	De Nederlandsche Bank
DOTS	Direction Of Trade Statistics (from the IMF)
ECU	Private ECU
EMU	Economic and Monetary Union
FF	French franc
IMF	International Monetary Fund
MITI	Ministry of International Trade and Industry (Japan)
NL	The Netherlands
New Z	New Zealand
OPEC	Organisation of Oil Exporting Countries
Pound	Pound sterling
ROW	Rest Of the World
SWF	Swiss franc
UK	The United Kingdom
US	The United States of America

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Executive summary

This report is a statistical report on the international use of major currencies. It contains a large set of tables, giving a quantitative analysis of international use of currencies since the beginning of the 1980s. Yet, data about the international use of currencies - in all the functions money fulfils, on a comparable basis, at the global level - are scarce. This report attempts to fill this gap. It presents a set of tables on international use of currencies at the global level. The tables are linked with a database. The data presented have been gathered from various official sources like the BIS, the OECD, the IMF, various Central Banks in Europe and the Japanese Ministry of International Trade and Industry, the Central Statistical Office in the UK. Some tables have been taken from articles about international use of currencies. Together, these data may be considered to give a complete quantitative overview of the international use of major currencies. By analysing these tables one can define the international role of the dollar, the Deutsche Mark, the yen and other major currencies in quantitative terms.

The report distinguishes between the role of an international currency as a unit of account, as a means of payment and as a store of value. It also makes a distinction between official and private sector. In total, we arrive 6 different roles of a currency. The report presents data on each use of the various currencies. The next paragraphs will explain how the use of a currency is defined in each function.

International currency use as a unit of account

The use of a currency as a unit of account by the *private sector* is presented first. The reports presents the use of currencies for denomination of international trade. Official data about the use of currencies for the denomination of trade at the global level do not exist. An estimation is made of the share of the US dollar, the Japanese yen, the Deutsche Mark, the French franc, the Italian lira and the Dutch guilder for denomination of total world exports. The estimation is based on official data from Central Banks in Europe, the Japanese Ministry of International Trade and Industry, the Central Statistical Office in the UK and data provided by other authors. The methodology and the assumptions of the estimations are explained in the annex I and II of the report.

The use of a currency as unit of account by the *public sector* is defined by the use of a currency as a numeraire for defining exchange rate parities. The number of countries pegged to a currency is shown, as well the share in world GDP of the countries that use a currency for a peg. The data have been received from the IMF (for the pegging of countries) and CEPII (for the GDP weights).

International currency use as a means of payment

The report investigates the use by the private sector of major currencies in the foreign exchange markets. The foreign exchange market is analysed by segment of the market, location of the financial centre and by currency. These data shed light on the vehicle role of the dollar and the DM. The data are based on two surveys from the BIS and on data from other authors.

The use by the *official sector*, i.e. interventions, are based on data from the Federal reserve and Treasury and on estimations by other authors. Data on interventions are usually confidential.

International currency use as a store of value

The use of the different currencies as an international store of value by the *private sector* is presented with a table that gives the currency composition of the international private financial wealth portfolio (WP). This analysis is based on "One Market, One Money" (European Economy, No. 44, October 1990, European Commission). The currency composition of the wealth portfolio is based on BIS data. The WP is analysed as a stock. Two components of the WP are also defined by flow, external bond offerings and external bank loans.

The use of a currency as a store of value by the *official sector* is presented with tables on the currency composition of official foreign exchange reserves. The currency composition of official reserves is given for the world, members of the European Monetary System and for selected Asian countries. The data on foreign exchange reserves are based on IMF data and estimations of other authors.

1. Introduction

This statistical report presents a large number of tables with detailed information on the international use of major currencies. There is no single source which presents data on the international use of currencies - in all the functions money fulfils - at the global level. This report attempts to fill this gap. For the first time, data on the use of all major currencies in their different functions are brought together within a single document. Information on the invoicing of international trade has been obtained from official sources in Europe and Japan.

The report distinguishes between the role of an international currency as:

- a means of payment or medium of exchange,
- a unit of account, and
- a store of value.

It is possible that a currency is relatively widely used as a store of value, but not as a means of payment or as a unit of account for denomination of international trade.

In the economic literature, data on the international use of major currencies in one particular function or on the international use of a single currency in all its functions can be found. This report goes one step further. It aims to describe the international role of all major currencies in all three functions since the beginning of the 1980s.

The report consists of three parts:

- Chapter 2 explains the distinction between the three international functions of money,
- Chapter 3 treats the international use of major currencies by the private sector, and
- Chapter 4 describes how and how much these currencies are used by the public sector.

Chapter 2 contains a table that clarifies the distinction between the different roles that major currencies play. The set-up of the table corresponds to the structure of the report. The international use of a currency is divided by function and user (official sector and private sector).

The tables in Chapter 3 illustrate the international use of currencies by the private sector. The chapter includes sections on:

- the denomination of international trade (3.1),
- foreign exchange market activity (3.2), and
- the denomination of international financial assets (3.3).

Section 3.1 analyses the use of currencies for denomination of imports and exports at the country level and at an aggregated, global level. Little reliable information on the invoicing pattern of international trade is readily available. A large part of the data presented is based on estimations using the statistics available from various official sources and the economic literature. Basic data have been obtained from, amongst other sources, the BIS, the OECD, the IMF, various European Central Banks, the Japanese Ministry of International Trade and Industry and the Central Statistical Office of the UK. Annexes I and II describe the basic data that have been used as well as the assumptions on which the estimations have been based.

Section 3.2 contains tables on the use of major currencies in the foreign exchange markets. Separate tables are devoted to the currency use in different segments of the market and in different locations (New York, London, etc).

The final Section 3.3 analyses the composition of the international financial wealth portfolio. This portfolio includes international bonds, Euro-notes, deposits of residents denominated in foreign currency and loans to residents made in foreign currency.

The tables in Chapter 4 illustrate the international currency use by the official sector. A distinction is made between the use of a currency for the definition of exchange rate parities, intervention in currency markets and the holding of official reserves of foreign exchange.

Four annexes are attached. Annex I aims to respond to the technical questions that arise when estimates of the denomination of international trade have to be calculated. It explains the methodology of the estimations, the aggregation of the invoicing patterns and the assumptions. A short summary of the underlying theory is given. Annex II presents the invoicing patterns of individual countries and includes brief descriptions of the estimations carried out. Some remarks are given on the data per country. Annex III presents additional information on the use of currencies as a currency of reference for monetary authorities. This annex shows the currency to which a country is pegged and their GDP, which has been used to weight the number of countries. Annex IV lists the contacts at Central banks and other sources of information.

All tables are stored in a database. Every table in the report makes reference to its location in the database. In addition, the tables systematically refer to the original data source used and offer a brief explanation of calculations that have been done. This presentation will facilitate a revision of the tables and the database when new data will be released.

2. Measuring international currency use**Table 1: The roles of an international currency**

Function	Sector	
	Private	Official
Unit of account	Currency used to invoice foreign trade and denominate international financial instruments	Currency used in expressing exchange rate relationships
Means of payment	Currency used to settle international trade and to discharge international financial obligations	Intervention currency in the foreign exchange markets and currency used for balance of payments financing
Store of value	Currency used to denominate deposits, loans and bonds	Reserve asset held by monetary authorities

Source: Tavlas (1992), based on Kenen (1983).

Source: Tavlas (1992, p.3)

Interpretation:

The role of an international currency is divided by function and user. Although one can distinguish between the different functions and users in theory, in practice it is difficult to measure the exact use of a currency by function and user. The division by user and function presented in Table 1 is the general structure of the set of tables in this report.

The set of tables presenting denomination of international trade (Table 2 to 9) measures the unit of account and means of payment function by the private sector. The Tables 10 to 19 present the use of the different currencies on the foreign exchange markets, i.e. international currency use as a means of payment. Although the official sector also trades on the foreign exchange markets (intervention), the main part of all foreign exchange trade concerns the trade by private sector by foreign exchange dealers. The currency composition of the international financial private wealth portfolio (Table 20 to 22) measures the use of the different currencies as a store of value by the private sector.

International use of currencies by the official sector is also divided by function. The unit of account function is measured by the use of a currency for defining exchange rate parities (Table 22), the means of payment function by amount of interventions made in a currency (Table 23) and the store of value function is measured by the share of a currency in the official foreign exchange holdings (Table 23 to 26).

File: ICFunct
Worksheet: Function

3. International currency use by the private sector

3.1. Denomination of international trade

International trade is priced in one currency. This means that at least one of the trading partners has to deal with a foreign currency when we assume that importer and exporter have different domestic currencies. A currency is called an international currency if it is used to denominate international trade.

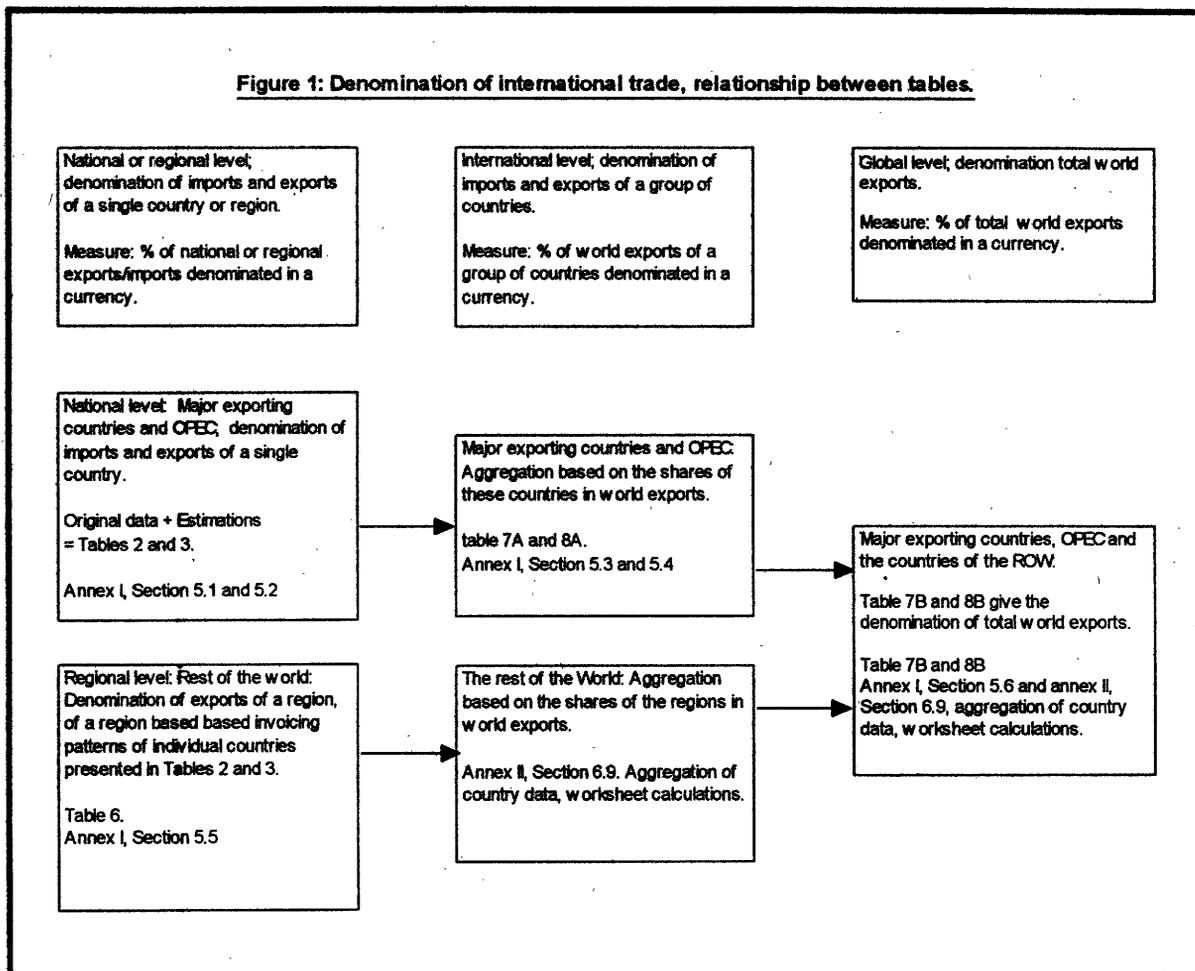
The tables in this report illustrate the use of the major currencies for the denomination of international trade. The tables show the international use of currencies by the private sector as a unit of account and as a means of payment. The relevance of the means of payment function is of relatively minor importance, given the small share of payments for exports in total foreign exchange activity. The data that are presented in the tables sometimes refer to payments data, sometimes to data about invoicing behaviour of exporters and importers. We have used payments data and invoicing data interchangeably and assume them to be comparable. The currency of denomination of invoices is considered to correspond with the currency of payments. Page (1981, p. 72) did not find a systematic difference between payments and invoicing data from France and Italy that provided data on both. Denomination will refer to payment, as well as invoicing.

The structure of the tables is illustrated with figure 1 on the next page.

Tables 2, 3 and 4 give the denomination of trade at the country level. These tables show which part of the national imports or exports is denominated in which currencies.

Table 5 gives the share of the different countries' exports in world exports. Table 6 presents the invoicing patterns in the ROW, which are based on assumptions about the invoicing behaviour of foreign traders.

Table 7 and 8 give the use of major currencies in denomination of world trade. These tables are an aggregation of the data at country level and the estimates about invoicing patterns in the six regions of the ROW.



Finally, Table 9 gives insight in the direction of the trade flows. Because trade is often denominated in the importer's or the exporter's currency the destination and origin of trade has considerable influence on the invoicing currency. This table gives an indication which part of a region's exports or imports is going to or coming from the dollar area or the European area.

Table 2: denomination of national exports*, in %

	1980							
	dollar	yen	DM	Ffranc	Pound	lira	guilder	other
United States	<u>96.0</u>	<u>0.2</u>	1.0	<u>0.7</u>	1.0	<u>0.2</u>	<u>0.3</u>	0.6
Japan	<u>65.7</u>	<u>29.4</u>	<u>1.9</u>	<u>0.6</u>	<u>1.1</u>	<u>0.1</u>	<u>0.6</u>	0.6
Germany	7.2	0.0	82.5	2.8	1.4	1.3	1.2	3.6
France	20.3	<u>0.1</u>	9.1	60.5	<u>2.1</u>	<u>1.5</u>	<u>0.8</u>	5.6
United Kingdom	17.0	<u>0.1</u>	3.0	2.0	76.0	<u>0.5</u>	<u>1.0</u>	0.4
Italy	30.0	<u>0.1</u>	14.0	8.0	<u>2.4</u>	36.0	<u>1.0</u>	8.5
The Netherlands	16.5	<u>0.0</u>	21.5	5.4	4.2	<u>0.9</u>	43.5	8.0

	1992							
	dollar	yen	DM	Ffranc	Pound	lira	guilder	other
United States	<u>92.0</u>	<u>1.5</u>	<u>1.3</u>	<u>0.9</u>	<u>0.9</u>	<u>0.4</u>	<u>0.6</u>	2.4
Japan	<u>46.6</u>	40.1	<u>3.3</u>	<u>0.9</u>	<u>1.6</u>	<u>0.4</u>	<u>1.0</u>	6.1
Germany	7.3	0.3	77.0	3.3	3.2	2.2	0.9	5.8
France	16.5	0.8	10.4	54.6	4.1	3.3	1.5	8.8
United Kingdom	<u>22.0</u>	<u>0.7</u>	<u>5.0</u>	<u>3.5</u>	62.0	<u>1.7</u>	<u>2.3</u>	2.8
Italy	<u>18.0</u>	<u>0.6</u>	<u>19.0</u>	<u>9.0</u>	<u>3.0</u>	40.0	<u>1.3</u>	9.1
The Netherlands	16.0	<u>0.5</u>	21.7	4.8	<u>4.8</u>	1.8	43.1	7.3

Source: Japanese Ministry of International Trade and Industry and Ministry of Finance, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank, Page (1981).

* Underlined numbers refer to estimates, see annex for a further explanation.

Source: Japanese Ministry of Finance and International Trade and Industry, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank, Page (1981, p. 60), Black (1991, p. 523-524) and extrapolations. See annex I Section 5.2 (Page 55) and annex II for a detailed explanation of the estimations.

Interpretation: In 1992, the share of Japanese exports denominated in US dollar is 46.6%.

Directory: Invoice

Worksheet: Inv Exports

Table 3: denomination of national imports*, in %

	1980							
	dollar	yen	DM	Ffranc	Pound	lira	guilder	other
United States	85.0	1.0	4.1	1.0	1.5	0.5	0.2	6.7
Japan	93.0	2.4	1.5	0.9	1.0	0.2	0.1	0.9
Germany	32.3	0.0	43.0	3.3	3.4	2.4	2.0	13.6
France	37.1	0.7	11.5	37.1	2.6	2.5	1.8	6.7
United Kingdom	29.0	1.3	9.6	4.7	38.0	1.7	2.8	12.9
Italy	45.0	0.5	14.0	9.0	3.2	18.0	1.7	8.6
The Netherlands	29.4	0.8	22.9	4.4	4.7	1.1	25.1	11.6

	1992							
	dollar	yen	DM	Ffranc	Pound	lira	guilder	other
United States	80.0	3.0	4.3	1.2	1.7	0.8	0.4	8.6
Japan	74.5	17.0	3.6	1.3	1.3	0.7	0.3	1.3
Germany	18.4	1.7	55.9	3.1	2.2	1.7	1.3	15.7
France	23.1	1.3	11.7	46.7	3.6	3.2	1.5	8.9
United Kingdom	22.0	2.4	11.9	5.3	43.0	2.2	3.2	10.0
Italy	26.0	0.9	16.0	7.0	3.5	34.0	2.4	10.2
The Netherlands	21.4	2.0	21.8	3.7	3.9	1.1	38.9	7.2

Source: Japanese Ministry of International Trade and Industry and Ministry of Finance, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank, Page (1981).

* Underlined numbers refer to estimates, see annex for a further explanation.

Source: Japanese Ministry of Finance and International Trade and Industry, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank, Page (1981, p. 60), Black (1991, p. 523-524) and extrapolations. See annex I Section 5.2 (Page 55) and annex II for a detailed explanation of the estimations.

Interpretation: In 1992, the share of Japanese imports denominated in US dollar was 74.5%.

Directory: Invoice

Worksheet: Inv Imports

Table 4: US dollar share in denomination of exports and imports*, in %

	Exports							
	1972	1976	1979	1980	1987	1990	1991	1992
United States	n.a.	90.0	98.0	<u>96.0</u>	<u>93.0</u>	n.a.	n.a.	<u>92.0</u>
Japan	90.4	78.0	n.a.	<u>65.7</u>	<u>54.6</u>	47.7	48.5	46.6
Germany	6.5	5.0	7.3	7.2	7.4	6.5	7.8	7.3
France**	10.3	9.4	11.6	20.3	14.8	15.5	16.2	16.5
United Kingdom	n.a.	15.5	17.0	17.0	26.0	n.a.	n.a.	<u>22.0</u>
Italy	28.3	31.1	n.a.	30.0	20.0	17.0	17.0	18.0
The Netherlands	13.2	13.0	19.0	16.5	16.9	16.9	17.0	16.0

	Imports							
	1972	1976	1979	1980	1987	1990	1991	1992
United States	n.a.	n.a.	85.0	85.0	<u>80.0</u>	n.a.	n.a.	<u>80.0</u>
Japan	80.0	89.9	n.a.	93.0	<u>80.5</u>	<u>75.8</u>	<u>76.2</u>	<u>74.5</u>
Germany	18.6	31.3	30.5	32.3	22.0	20.9	20.5	18.4
France**	15.6	29.1	28.7	37.1	20.7	22.2	23.4	23.1
United Kingdom	n.a.	n.a.	29.0	29.0	24.0	n.a.	n.a.	<u>22.0</u>
Italy	32.1	50.6	n.a.	45.0	28.0	26.0	27.0	26.0
The Netherlands	17.7	22.7	31.5	29.4	23.9	22.8	22.8	21.4

Source: Japanese Ministry of International Trade and Industry- and Finance, Deutsche Bundesbank, Banque de France, Central Statistical Office (UK), Banca d'Italia, De Nederlandse Bank and; Page (1981), Scharrer (1979), Kenen (1983) for data until 1980.

* Underlined numbers refer to estimates, see appendix for a further explanation.

** Data for France in the year 1980 refer to the year 1981.

Source: Japanese Ministry of Finance and International Trade and Industry, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank; Scharrer (1979, p. 455), Page (1981, p. 60), Kenen (1983 p. 20) and Black (1991, p. 523-524). See annex for a detailed explanation of the estimations.

Interpretation: In 1992, the share of Japanese imports denominated in US dollar was 74.5%. The column for 1980 of exports is similar to the one in Table 2, the one of imports is similar to the one in Table 3.

Directory: Invoice

Worksheet: Dollar Share

Table 5: Distribution of world exports by region, in %

	1980	1987	1992	EC + EFTA as one market* 1992
US, Canada, Australia and New Zealand	16.8	16.4	17.2	25.1
United States	11.7	10.8	12.1	17.7
Asia **	13.4	21.6	23.8	34.9
Japan	6.9	9.8	9.2	13.5
European Union and EFTA***	42.6	47.5	45.7	20.6
Germany	10.2	12.5	11.6	6.1
France	6.2	6.3	6.4	3.3
United Kingdom	5.8	5.6	5.2	2.9
Italy	4.1	4.9	4.9	2.8
The Netherlands	3.9	3.9	3.8	1.1
Oil Exporting Countries ****	16.0	5.2	5.1	7.5
Other	11.3	9.3	8.2	12.0
Total, in %	100	100	100	100
Total world exports in billion US \$	1885.6	2352.4	3687.0	2521.1

Source: IMF, Direction of Trade Statistics, yearbook 1980-86 and 1986-1992.

* Trade between EU and EFTA countries is excluded from world trade.

Only exports from EU and EFTA going out of the EU-EFTA area are considered as world exports.

** Asia as in IMF yearbook, Indonesia (Oil exporting country) excluded.

*** European Free Trade Association (EFTA) comprises Austria, Finland, Norway, Sweden and Switzerland. The European Union (EU) comprises Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and the United Kingdom.

**** The Oil Exporting Countries comprise Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Oman, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela, (like in the IMF yearbook).

Source: IMF, Direction of Trade Statistics, Yearbook 1980-86 and 1986-92.

Interpretation: In 1992, the share of world exports of the European Union and EFTA together amounted to 45.7% of total world exports.

File: Invoice

Worksheet: World Exports

Table 6: Estimations of denomination of exports of ROW*, in %

	dollar	yen	1980					
			DM	FF	Pound	lira	guilder	other
EFTA +restEU	18.2	0.1	11.9	4.6	2.5	0.7	1.0	61.1
Can, Aus, NewZ.	85.9	0.2	1.3	0.7	1.0	0.2	0.4	10.3
Asia (excl.Japan)	85.9	0.5	1.3	0.7	1.0	0.2	0.4	10.0
Africa	70.1	0.2	9.3	5.7	6.4	2.8	3.4	2.1
Other Europe	57.1	0.1	13.5	8.2	9.1	4.1	4.9	2.9
Middle East	96.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0
Western Hemisphere	76.6	0.2	7.3	4.5	5.1	2.2	2.6	1.8
Oil exporting countries**	96.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0

	dollar	yen	1992					
			DM	FF	Pound	lira	guilder	other
EFTA +restEU	16.0	0.6	14.0	5.2	3.8	2.3	1.5	56.8
Can, Aus, NewZ.	76.9	1.7	2.0	0.9	1.1	0.4	0.7	16.3
Asia (excl.Japan)	76.9	3.1	2.0	0.9	1.1	0.4	0.7	14.9
Africa	66.7	1.2	9.7	5.6	5.7	3.5	3.7	3.9
Other Europe	54.0	1.0	14.0	8.0	8.2	5.1	5.2	4.6
Middle East	92.0	0.0	2.0	2.0	2.0	2.0	0.0	0.0
Western Hemisphere	73.0	1.3	7.6	4.4	4.5	2.8	2.9	3.5
Oil exporting countries**	92.0	0.0	2.0	2.0	2.0	2.0	0.0	0.0

* These shares are the result of an extrapolation, see annex I, Section 5.5 for a further explanation.

**The estimations for OPEC countries are made by Black (1991, p. 523-524)

NOTE: the division in regions is based on the IMF yearbook, see annex I Section 5.1 for a definition of these regions.

Source: The estimations for these regions are based on invoicing patterns from the US, Japan and the five biggest European exporters. Invoicing in EFTA and rest EU is assumed to behave like the European exporters. The group Can, Aus and New Z., and Asia behave like Japan and the US with a weight of 2/3 for the US and 1/3 for Japan. Africa, Other Europe, and the Western Hemisphere invoice like Europe and the US with corresponding weights of 1/3-2/3, 1/2-1/2 and 1/4-3/4 for Europe and the US. The invoicing pattern of the Middle East is assumed to be like the one of the OPEC countries. However; the use of a currency as a *foreign currency* may not be approximated with the use of this currency in the home country. This implicates for example that the use of the DM in the EFTA and rest of the EU countries is estimated by the use of the DM by four European countries, thereby excluding the use of the DM by Germany. See Section 5.5 page 71 and in II page 96 for a detailed explanation of the estimations.

Interpretation: In 1992, the share of exports from Asia (excluding Japan) denominated in dollar is estimated at 76.9%.

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Worksheet: Inv Exp ROW

Table 7A: Denomination of exports of 7 major exporting countries and OPEC, in % of world exports and relative to size issuing country in world trade**

	1980		1987		1992	
	% of world exports	relative to world trade*	% of world exports	relative to world trade*	% of world exports	relative to world trade*
US dollar	36.0	2.9	25.2	1.8	24.7	1.9
Japanese yen	2.1	0.3	3.6	0.4	4.1	0.5
Deutsche mark	11.0	1.1	13.1	1.2	12.2	1.1
French franc	5.0	0.8	5.1	0.8	5.0	0.8
Pound sterling	5.3	0.9	4.3	0.7	4.5	0.8
Italian lira	1.8	0.4	2.5	0.5	2.8	0.6
Dutch guilder	2.1	0.5	2.2	0.6	2.2	0.6
Total, in %	63.2		56.1		55.4	

Table 7B: Denomination of world exports, share of major currencies in % of world exports and relative to size of issuing country in world trade

	1980		1987		1992	
	% of world exports	relative to world trade*	% of world exports	relative to world trade*	% of world exports	relative to world trade*
US dollar	56.1	4.5	47.9	3.4	47.6	3.6
Japanese yen	2.1	0.3	4.0	0.5	4.8	0.6
Deutsche mark	13.6	1.4	16.1	1.5	15.3	1.4
French franc	6.2	0.9	6.5	1.0	6.3	1.0
Pound sterling	6.5	1.1	5.5	0.9	5.7	1.0
Italian lira	2.2	0.5	3.2	0.6	3.4	0.7
Dutch guilder	2.6	0.7	2.8	0.7	2.8	0.8
Total, in %	89.4		86.0		85.9	

Source: Japanese Ministry of International Trade and Industry- and Ministry of Finance, Deutsche Bundesbank, Banque de France, Central Statistical Office (UK), Banca d'Italia, De Nederlandsche Bank, Page (1981), Black (1991).

* The ratio is obtained by dividing the share of world exports in a given currency divided by the share in world trade of the issuing country in world trade.

** "Major exporting countries" comprises the United States, Japan, Germany, France, the United Kingdom, Italy and the Netherlands.

Source: IMF; DOTS, Japanese Ministry of International Trade and Industry and Ministry of Finance, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank, Page (1981, p. 60), Black (1991, p. 523-524) and extrapolations. See annex I for a detailed explanation.

Interpretation: In 1992, 47.6% of total world exports were denominated in US dollar. The exports of the major exporting countries and OPEC denominated in dollar account for 24.7% of world exports. The exports of this group of major exporting countries and OPEC account for 58.4% of world exports (see annex II, Aggregation of country data, worksheet calculations). The ratio "relative to world trade" indicates to what extent a currency is used, more or less, than the share of the issuing country in world trade accounts for. If a country has a share in world trade of 5% and its national currency denominates 5% of world exports the ratio is 1.

NOTE: The share of a country in world trade is measured by the share of its imports and exports divided by the sum of world imports and exports. The US share in world trade is measured by $(X^{us} + M^{us}) / (X^{world} + M^{world})$. The share of a currency in denomination of world exports is divided by its share in world trade (and not by its share in world exports) because a large part of exports and imports of an industrial country are usually denominated in the domestic currency. Thus if a country is importing a great share of world exports, the share of its currency in denomination of world exports will be "automatically" higher.

Directory: Invoice
Worksheet: Currency Share

Table 8A: Distribution by region and currency of denomination of exports of 7 major exporting countries* and OPEC, in % of world exports

	US dollar		Deutsche mark		Japanese yen	
	1980	1992	1980	1992	1980	1992
United States	11.2	11.2	0.1	0.2	0.0	0.2
Japan	4.5	4.3	0.1	0.3	2.0	3.7
Europe 5	4.9	4.5	10.6	11.6	0.0	0.2
OPEC countries	15.3	4.7	0.2	0.1	0.0	0.0
Total	36.0	24.7	11.0	12.2	2.1	4.1

Table 8B: Distribution by region and currency of denomination of world exports, in % of world exports

	US dollar		Deutsche mark		Japanese yen	
	1980	1992	1980	1992	1980	1992
US, Can, Aus and NewZ	15.6	15.0	0.2	0.3	0.0	0.3
Asia	10.1	15.5	0.2	0.6	2.1	4.2
EU and EFTA	7.1	6.7	12.1	13.6	0.0	0.3
OPEC and Middle-East	16.2	5.4	0.2	0.1	0.0	0.0
Other**	7.2	4.9	1.0	0.7	0.0	0.1
Total	56.1	47.6	13.6	15.3	2.1	4.8

Source: Japanese Ministry of International Trade and Industry- and Ministry of Finance, Deutsche Bundesbank, Banque de France, Central Statistical Office (UK), Banca d'Italia, De Nederlandsche Bank, Page (1981), Black(1991). and estimates, see annex for a detailed explanation.

* Major exporting countries comprises the United States, Japan, Germany, France, the United Kingdom, Italy and the Netherlands. **Other here comprises Africa, Other Europe and the Western Hemisphere, see annex I, Section 5.1.

Source: IMF; DOTS; Japanese Ministry of Finance and International Trade and Industry, Deutsche Bundesbank, Banque de France, Central Statistical Office, Banca d'Italia, De Nederlandsche Bank, Page (1981, p. 60), Black (1991, p. 523-524) and extrapolations. See annex for a detailed explanation.

Interpretation: In 1992, 47.6% of total world exports were denominated in dollar. The dollar denominated exports of Asia accounted for 15.5% of world exports.

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Worksheet: Regional Distr

**Table 9: Direction of exports in different regions of ROW
developing countries, in %, 1992**

	Share of exports going to, in %					world exports in billion US \$
	EU, EFTA countries	intensive \$ using countries*	(US)	Other	Total	
exports from:						
Oil exp countries	26.7	66.3	16.1	7.1	100	189.6
Asia	16.6	79.1	20.8	4.3	100	573.2
Africa	46.6	29.9	14.6	23.5	100	90.4
Other Europe	59.4	16.6	3.4	24.1	100	73.2
Western Hemisphere	21.6	76.2	41.8	2.2	100	149.4
World	45.6	48.6	14.4	5.8	100	3687.0
	Share of imports from, in %					world exports in billion US \$
	EU, EFTA countries	intensive \$ using countries*	(US)	Other	Total	
imports of:						
Oil exp countries	40.6	55.2	14.8	4.3	100	157.5
Asia	15.4	80.6	13.7	4.0	100	616.5
Africa	52.3	32.1	8.0	15.5	100	95.2
Other Europe	57.9	19.9	5.3	22.3	100	99.1
Western Hemisphere	21.6	75.6	43.7	2.9	100	176.8
World	44.3	50.3	12.2	5.4	100	3846.1

Source: IMF; DOTS, yearbook 1986-92, regions as in the IMF yearbook of the developing countries.

* include US, Canada, Australia, Japan, New Zealand, Asia, Middle East and Western Hemisphere.

Source: IMF, DOTS, Japanese Ministry of Finance and International Trade and Industry, Scharrer (1979, p. 455), Page (1981, p. 60), Kenen (1983 p. 20)

NOTE: Dollar intensive using countries here refers to the countries that invoice the majority of their trade in dollar. This group of countries includes: US, Canada, Australia, New Zealand, Middle East, Western Hemisphere, Japan and Asia.

Interpretation: In 1992, exports of the oil exporting countries to the world totalled 189.6 billion US dollar; 26.7% of these exports were going to EU and EFTA countries, 66.3% were going to intensive dollar using countries. Asian exports totalled 573.2 billion US dollar, 79.1% of Asian exports was going to dollar intensive using countries. World imports totalled 3846.1 billion US dollar. African imports totalled only 95.2 billion US dollar, 52.3% of these imports were coming from the EU and EFTA.

File: Invoice

Worksheet: Trade Flows

3.2. Medium of exchange in foreign exchange market

The use of currencies in the foreign exchange market is a very important part of international currency use. This use tells something about the ability of a currency to be an efficient medium of exchange.

In the foreign exchange markets, economies of scale play an important role. The higher the volume, the lower will be the transactions costs, see Demsetz (1968, p. 40) A result of these economies of scale is the use of vehicle currencies to exchange currencies. When a vehicle currency is used, one first exchanges a currency to a vehicle currency and subsequently into the finally desired currency. For example, a currency trader wishes to exchange Belgium francs into Canadian dollars (the finally desired currency). Then he first exchanges Belgium francs into US dollars and subsequently into Canadian dollars. In this example the US dollar is used as a vehicle to exchange Belgium francs against Canadian dollars. Krugman (1980 and 1984) has written about the dynamics of this process. Jones' work "The origin and development of media of exchange" gives an explanation how a medium of exchange can emerge through the uncoordinated market behaviour of rational economic agents that minimise transactions costs, see Jones (1976).

In the next set of tables we consider the use of currencies in the foreign exchange market. This use is defined as the international use of currencies by the private sector as a medium of exchange. However, concerning global foreign exchange market activity, this trade also includes trading which is conducted by the official sector, i.e. interventions by monetary authorities. But, the share in the volume of total foreign exchange trading conducted by official authorities is marginal, relatively to the enormous amounts, estimated at 880 billion US dollars a day, that are traded in the foreign exchange markets.

Most of the data considered in the following set of tables have been compiled from the surveys of the BIS in April 1989 and 1992. However, these two surveys are not fully comparable. In 1992 a greater number of countries (26) participated in the survey, including Germany that did not participate in 1989. The first table presents the overall use of a currency in foreign exchange markets. The division by segment of the market is shown in Tables 10 and 11.

Tables 12 till 15 show the volume of the different currency pairs. Nowadays, the DM and the dollar are the only currencies traded with a considerable volume against various currencies. These tables give insight in the vehicle role of the dollar and the DM.

The characteristics of the different financial markets are presented in Tables 16 till 19. Here the composition of trade per financial centre is given. We can identify which currencies are traded most in a given foreign exchange centre.

Table 10: Distribution of foreign exchange turnover, currency on one side of the transaction, in %, 1989 and 1992

	1989	1992*	1992
US dollar	90	83	82
Deutsche Mark	27	38	40
Yen	27	24	23
Pound sterling	15	14	14
ECU	1	3	9
Other	40	38	32
Total	200	200	200
Turnover, in billion US \$**	620		880

Source: BIS, Central bank survey of foreign exchange market activity in April 1992.

* On a comparable basis with 1989.

** Estimated global turnover, total reported turnover amounted to 832 (1992) and 560 (1989) billion US \$.

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, (Table II, p. 9).

NOTE: Because two currencies are involved in each transaction, totals add to 200 percent. The table that gives the 1992 figures on a comparable basis with 1989 relates only to the 21 countries that have been reporting data in both 1989 and 1992. Moreover, domestic trading involving the Deutsche mark in Germany is excluded, see Survey 1992, page 9.

Interpretation: In 1989, 90% of all foreign exchange transactions had the US dollar on one side of the transaction.

File: Forex

Worksheet: Total Turnover

Table 11: Global foreign exchange turnover, % of a currency on one side of the transaction, per segment and currency, 1992

	dollar	DM	yen	Pound	SWF	FF	ECU	OthEMS	Other	Total**	Totals* in billion US \$
I.Spot	72.1	53.2	20.1	14.3	9.6	3.8	3.0	9.3	14.6	200	393.7
-with oth.exch.deal.***	71.2	56.8	20.3	14.3	9.9	3.7	3.0	8.3	12.4	200	282.0
II.Forward Outright	75.6	36.3	26.5	15.6	8.8	4.0	2.7	9.8	20.8	200	58.5
III.Forward Swaps	95.3	22.4	25.7	12.8	7.3	4.3	3.3	9.5	19.4	200	324.3
-with oth.exch.deal.***	97.0	22.2	24.4	12.8	7.6	4.0	3.2	9.6	19.2	200	237.6
IV.Futures	97.2	42.3	30.2	11.4	7.3	0.1	0.0	1.7	9.8	200	9.5
V.Options	77.3	50.6	35.1	11.7	6.4	1.6	0.2	1.7	15.4	200	37.7
Total	82.0	39.6	23.4	13.6	8.4	3.8	2.9	8.9	17.4	200	832.0

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992.

* Totals do not sum owing to incomplete reporting of market segment breakdowns.

** Total sums to 200 percent because two currencies are involved in a transaction.

*** Other exchange dealers refers to other dealers either in the same country or in another country participating in the survey. These transactions refer to the interbank market. The other categories are "other financial institutions" and "customers".

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, (Annex Tables; Table 1A).

NOTE: Reported exchange market turnover, net of local and cross-border double-counting in April 1992, by segment of the market, daily averages. Because two currencies are involved in each transaction, totals add up to 200 percent.

Interpretation: In 1992, 72.1% of all foreign exchange transactions on the spot market had the US dollar on one side of the transaction. In April 1992, nearly the half (393.7 billion US dollar) of all foreign exchange transactions were transactions on the spot market. The difference with the total in Table 10 is a difference in definition of the total in Table 10 and Table 11. The 832 billion US dollar in Table 11 is the total reported foreign exchange turnover. However, the estimated global turnover, presented in Table 10, amounts to 880 billion US dollar. As you can see almost all foreign exchange occurs between dealers. Of the total (393.7 billion US dollar) on the spot market, 282.0 billion US dollar is traded between dealers.

File: Forex

Worksheet: TO per Segment

**Table 12: Total net foreign exchange turnover by currency pairs,
April 1992, % of daily average turnover**

	By segment of the market					total**
	spot	forward	swap	futures	options	
US dollar/Deutsche mark	29.6	21.7	19.4	41.5	34.3	25.4
US dollar/Japanese yen	15.7	20.4	25.0	29.9	27.9	20.2
US dollar/Pound sterling	8.5	9.4	11.5	11.1	4.1	9.5
US dollar/Swiss franc	5.9	6.1	6.8	7.2	3.3	6.1
US dollar/Canadian dollar	2.0	2.9	4.9	2.9	2.7	3.2
US dollar/Australian dollar	1.5	2.1	3.4	2.0	2.2	2.3
US dollar/French franc	1.3	2.3	3.8	0.1	1.3	2.3
Deutsche mark/Pound sterling	4.9	3.1	0.7	0.1	5.8	3.1
Deutsche mark/Japanese yen	3.9	3.5	0.3	0.1	6.0	2.5
Deutsche mark/Swiss franc	2.9	1.6	0.2	0.1	2.4	1.7
Other intra-EMS currencies	7.0	4.0	1.0	0.2	1.4	4.1
All other*	16.8	23.0	23.1	4.9	8.5	19.6
Total	100	100	100	100	100	100
Reported turnover in billion US \$**	393.7	58.5	324.3	9.5	37.7	832.0

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992.

* These include also currency pairs involving the US dollar and the DM.

** Totals per segment do not sum owing to incomplete reporting of market segment breakdowns.

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, (Table IIB, p. 10).

NOTE: Total net reported foreign exchange turnover by currency pairs in April 1992, percent of daily average turnover.

Definitions:

Spot market; single most important segment of the market, exchanges amounts of two currencies within the space of two days (Group of Ten, p. 128).

Outright forward; similar to spot transactions, except that they are for settlement more than two days hence, (Group of Ten, p. 130).

Swap market; the swap market is the second most important segment, swap deals include two transactions. The two counterparties agree to exchange two currencies at a particular rate at one date and to reverse the transaction the transaction, generally at a different rate, at some future date, (Group of Ten, p. 130). Only one transaction, the first, is recorded in the survey.

Futures; similar to a forward contract, however they differ from forward contracts in that they are standardised around and settled by a clearing house.

Options; give the purchaser of a forward contract the right, not the obligation, to buy or sell a certain amount of currency, in the future at a predetermined rate.

Interpretation: 29.6% of all foreign exchange traded spot market consisted of trade between the dollar and the DM, total adds up to 100%. Considering total foreign exchange transactions in all different segments of the market, 20.2% of all transactions was a transaction between the dollar and the yen. Total reported transactions on the spot market amounted 393.7 billion US dollar.

File: Forex
Worksheet: Curr Pairs

Table 13: Composition of global foreign exchange turnover involving US dollar or DM, per segment, April 1992, in %

	US dollar against:									Total*, in billion US \$
	DM	yen	Pound	SWF	FF	ECU	OthEMS	Other	Total	
I.Spot	41.0	21.8	11.8	8.2	1.8	0.9	4.5	10.0	100	283.8
-with oth.exch.deal.	43.8	22.0	11.4	8.3	1.5	0.7	3.9	8.4	100	200.7
II.Forward Outright	28.7	26.9	12.4	8.0	3.1	1.4	5.9	13.6	100	44.2
III.Forward Swaps	20.3	26.2	12.1	7.2	3.9	3.2	8.9	18.1	100	309.0
-with oth.exch.deal.	20.5	24.9	12.4	7.6	3.8	3.1	9.3	18.4	100	230.6
IV.Futures	42.7	30.8	11.4	7.4	0.1	0.0	1.4	6.2	100	9.2
V.Options	44.4	36.1	5.3	4.3	1.7	0.2	0.6	7.4	100	29.1
Total, in %	30.9	24.7	11.6	7.5	2.8	1.9	6.4	14.2	100	682.4
	Deutschemark against:									Total*, in billion US \$
	USdollar	yen	Pound	SWF	FF	ECU	OthEMS	Other	Total	
I.Spot	55.6	7.3	9.3	5.5	3.9	2.8	8.6	7.0	100	209.3
-with oth.exch.deal.	54.9	7.7	9.8	5.7	4.2	3.2	8.3	6.3	100	160.3
II.Forward Outright	59.6	9.6	8.4	4.4	1.4	1.0	6.7	8.8	100	21.3
III.Forward Swaps	86.6	1.3	3.0	1.1	1.4	0.3	2.3	4.1	100	72.6
IV.Futures	98.3	0.2	0.2	0.2	0.0	0.0	0.5	0.7	100	4.0
IV.Options	67.7	11.9	11.5	4.8	0.0	0.0	1.9	2.1	100	19.1
Total, in %	64.0	6.2	7.7	4.3	2.9	1.9	6.5	6.3	100	329.6

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992.

* Total transactions with the US dollar or the DM on one side of the transaction, totals do not sum owing to incomplete reporting of market segments breakdowns.

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, (Annex Tables: Table I-B and I-C).

Interpretation: Of all foreign exchange traded involving the DM on the spot market, 55.6% was traded against the dollar and, total adds up to 100%. Total spot transactions having the dollar on one side amount to 283.8 billion US dollar, 41% of this total was traded against the DM. Link with table 11: 72.1% (share dollar spot, Table 11) * 393.7 (total spot, Table 11) = 283.8 (total against dollar spot, Table 13).

File: Forex

Worksheet: CPairs per Segment

Table 14: Amount of exchanges between individual currencies and dollar or DM, in billion of US dollar, April 1992

		<u>Spot market transactions</u>									Total
		USdollar	DM	yen	Pound	SWF	FF	ECU	OthEMS	Other	in billion US \$
Against:		283.8	209.3	79.2	56.5	37.8	14.9	11.7	36.8	57.5	393.7
USdollar	NA	116.4	61.9	33.5	23.1	5.0	2.6	12.8	28.4	283.8	
DM	116.4	NA	15.2	19.4	11.5	8.2	5.9	17.9	14.7	209.3	
Other	167.4	92.9	2.1	3.6	3.2	1.6	3.2	6.0	14.4	294.4	
		<u>Forward Swap market transactions</u>									Total, in
		USdollar	DM	yen	Pound	SWF	FF	ECU	OthEMS	Other	billion US \$
Against:		309.0	72.6	83.3	41.6	23.5	13.9	10.8	30.7	63.0	324.3
USdollar	NA	62.8	80.9	37.4	22.1	12.2	9.9	27.6	56.0	309.0	
DM	62.8	NA	0.9	2.1	0.8	1.0	0.2	1.7	3.0	72.6	
Other	246.1	9.7	1.5	2.1	0.6	0.8	0.7	1.5	4.0	267.0	

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, own compilation, based on tables 1-A, 1-B and 1-C.

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, (own compilation, derived from Annex Tables: Table 1-A, 1-B and 1-C).

Interpretation: This table demonstrates the vehicle function of the dollar (in the spot and swap market) and the DM in the spot market. The volume on the spot market between the DM and the FF is bigger than between the dollar and the FF. From the 14.9 billion dollar daily turnover involving the FF, 8.2 is traded against the DM, 5 is traded against the dollar. Total foreign exchange trading in the forward swap market involving the DM amount to 72.6 billion US dollar, 62.8 billion was swapped against the dollar. Total transactions in the swap market amounted to 324.3, the DM was only on one side of the transactions accounting for 72.6 billion US dollar. In the swap market the dollar is the only vehicle currency.

Link with table 11 and 13; see total on the spot market is equal, 393.7 billion US \$. Total against dollar is 283.8 ($72.1\% * 393.7 = 283.8$, Table 11), see also Table 13 and Table 14. Total transactions in yen on the spot market is ($20.1\% * 393.7 = 79.2$, Table 11, also in Table 14). Total transactions yen against dollar is 61.9 billion ($21.8\% * 283.8 = 61.9$, Table 13, also Table 14)

File: Forex

Worksheet: DM Dollar Vehicle

**Table 15: Foreign exchange turnover in New York by currency pairs,
in % of daily average turnover**

	April 1977	May 1980	April 1983	May 1986	April 1989	April 1992
US dollar/Deutsche mark	27.3	31.8	32.5	34.2	32.9	34.0
US dollar/Japanese yen	5.3	10.2	22.0	23.0	25.2	23.0
US dollar/Pound sterling	17.0	22.7	16.6	18.6	14.6	9.0
US dollar/Swiss franc	13.8	10.1	12.2	9.7	11.8	8.0
US dollar/French franc	6.3	6.9	4.4	3.6	3.2	
US dollar/Canadian dollar	19.2	12.2	7.5	5.2	4.0	
US dollar/Other	11.1	6.1	4.6	5.8	4.7	
Cross currency	0.0	0.0	0.2	0.0	3.6	
Total	100	100	100	100	100	

Source: 1977: Kubarych (1983, 21), 1980-1986: Tavlas and Ozeki (1992, 34), 1989: Black (1991, 552), 1992: Bank of England (1992, 411).

Source: 1977: Kubarych (1983, p. 21), 1980-1986: Tavlas and Ozeki (1992, p. 34), 1989: Black (1991, p. 522), 1992: Bank of England (1992, p. 411)

Interpretation: In 1977, sterling was on one side of 17% of all transactions on the foreign exchange market in New York. Cross currency, i.e. not involving the dollar, was 0.0%. In 1989, 32.9% of all foreign exchange transactions in New York were between the dollar and the DM.

File: Forex
Worksheet: Curr Pairs NY

Table 16: Currency composition of foreign exchange market activity per financial centre, % of currency on one side of the transactions, 1989, 1992

	USdollar	DM	yen	Pound	ECU	Other	Total	Total* in billion US \$
1989								
United Kingdom	89.6	29.0	17.4	30.7	1.7	31.5	200	241.0
United States	96.0	33.3	27.6	14.4	0.3	28.4	200	174.0
Japan	95.2	9.7	80.0	3.7	0.0	11.4	200	145.0
Singapore	95.2	28.6	28.6	17.5	0.0	30.2	200	68.0
Switzerland	75.0	32.4	7.8	7.6	0.7	76.5	200	63.0
Hong Kong	93.3	20.0	25.0	12.8	0.2	48.7	200	60.0
Germany	NA	NA	NA	NA	NA	NA	NA	NA
France	71.9	43.8	5.3	1.9	2.2	75.0	200	32.0
Other fin. centres	85.0	26.4	4.8	6.2	1.8	76.0	200	149.4
								932.4
1992								
United Kingdom	80.4	41.4	15.2	23.9	5.0	34.1	200	300.2
United States	88.7	43.8	25.6	11.5	0.9	29.5	200	192.3
Japan	92.4	18.6	73.9	5.6	0.4	9.1	200	126.1
Singapore	90.4	36.6	31.5	14.7	0.9	25.8	200	75.9
Switzerland	72.9	43.5	8.8	8.2	3.4	63.1	200	68.1
Hong Kong	90.2	32.4	28.0	13.5	0.5	35.3	200	60.9
Germany	75.8	83.4	7.1	5.8	0.0	27.9	200	56.5
France	61.2	54.7	6.8	6.6	7.1	63.5	200	35.5
Other fin. centres	75.3	39.7	6.5	8.5	5.4	64.7	200	214.8
								1130.3

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992 (Table 2-A) and April 1989 (Table C-1)

*Totals are net of local inter dealer double countings but including cross border double countings, so total does not equal total of Table 10 (estimated net global turnover) and table 11 (net reported turnover, excl. local and cross border double countings).

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1989 and 1992, (1992: Annex Tables: Table 2-A, 1989: Table C-1, p. 14).

Interpretation: This table presents the importance of the different currencies in the various financial centres. Of all foreign exchange trading conducted in the UK foreign exchange market in April 1992, the dollar was on one side of 80.4% of all transactions.

File: Forex
Worksheet: Per Fin Centre

Table 17A: Division of foreign exchange trading in a given currency by location of financial centre*, in % of global trading in a currency, 1989

	<u>% of total trading in:</u>						<u>% of global foreign exchange turnover</u>
	US dollar	DM	yen	pound	ECU	Other	
United Kingdom	25.8	28.3	16.6	53.6	47.1	20.2	25.8
United States	19.9	23.4	19.0	18.1	5.9	12.8	18.7
Japan	16.5	5.7	45.8	3.9	0.0	4.5	15.6
Switzerland	6.1	8.9	2.1	3.8	5.9	13.6	7.3
Singapore	7.2	7.3	7.1	8.0	0.0	5.2	6.8
Hong Kong	6.7	4.9	5.9	5.6	1.2	7.6	6.4
France	2.7	5.7	0.7	0.4	8.2	6.3	3.4
Other financial centres	15.2	15.9	2.8	6.7	31.8	29.8	16.0
Total	100	100	100	100	100	100	100

Table 17B: Currency specialisation index per financial centre, 1989**

	US dollar	DM	yen	pound	ECU	Other	<u>% of global foreign exchange turnover</u>
United Kingdom	1.0	1.1	0.6	2.1	1.8	0.8	25.8
United States	1.1	1.3	1.0	1.0	0.3	0.7	18.7
Japan	1.1	0.4	2.9	0.3	0.0	0.3	15.6
Switzerland	0.8	1.2	0.3	0.5	0.8	1.9	7.3
Singapore	1.1	1.1	1.1	1.2	0.0	0.8	6.8
Hong Kong	1.0	0.8	0.9	0.9	0.2	1.2	6.4
France	0.8	1.6	0.2	0.1	2.4	1.8	3.4
Other financial centres	0.9	1.0	0.2	0.4	2.0	1.9	16.0

Source: BIS, Survey of Foreign Exchange Market Activity, April 1989, own calculations.

* This table indicates where the biggest market for a certain currency exists. It shows which part of total foreign exchange trading in a given currency is traded in which financial centre.

** The specialisation index measures to which extent the use of a currency is spread around the world, if the index is around 1 for every financial centre, the currency is evenly spread around the globe. This is especially the case for the dollar but also for the DM. The index is calculated by dividing the share of global use of a currency in a given centre by the share of global foreign exchange turnover conducted in the centre. For example the specialisation index for the yen in London is: $16.6/25.8=0.6$.

Source: BIS, Survey of Foreign Exchange Market Activity in April 1989, (based on Table C-1, p. 14, own compilations).

Interpretation: Of all foreign exchange trading involving the pound sterling, 53.6% was traded in London. The biggest market for the DM is also in London, 28.3% of all transactions involving the DM were conducted in London. Total adds up to 100%. The specialisation index factor for the London in pound is calculated dividing the share of the transactions in a pound in a given London by the share of world turnover of the London foreign exchange market, i.e. 53.6% divided by 25.8% and equals 2.1.

File: **Forex**
Worksheet: **Rel Size 1989**

Table 18A: Division of foreign exchange trading in a given currency by location of financial centre*, in % of global trading in a currency, 1992

	% of total trading in:							% of global foreign exchange turnover
	US dollar	DM	yen	pound	SWF	FF	ECU	
United Kingdom	26.0	27.0	17.9	47.9	23.6	30.2	43.1	26.6
United States	18.4	18.3	19.3	14.8	19.9	12.3	4.9	17.0
Japan	12.6	5.1	36.5	4.7	2.8	2.2	1.5	11.2
Singapore	7.4	6.0	9.3	7.5	8.0	2.4	2.0	6.7
Switzerland	5.4	6.4	2.4	3.7	32.8	4.7	6.7	6.0
Hong Kong	5.9	4.3	6.7	5.5	2.9	1.3	0.9	5.4
Germany	4.6	10.2	1.6	2.2	2.6	0.0	0.0	5.0
France	2.3	4.2	1.0	1.6	1.0	40.0	7.3	3.1
Other financial centres	17.4	18.5	5.4	12.1	6.4	6.9	33.5	19.0
Total	100	100	100	100	100	100	100	100

Table 18B: Currency specialisation index per financial centre, 1992**

	US dollar	DM	yen	pound	SWF	FF	ECU	% of global foreign exchange turnover
United Kingdom	1.0	1.0	0.7	1.8	0.9	1.1	1.6	26.6
United States	1.1	1.1	1.1	0.9	1.2	0.7	0.3	17.0
Japan	1.1	0.5	3.3	0.4	0.2	0.2	0.1	11.2
Singapore	1.1	0.9	1.4	1.1	1.2	0.4	0.3	6.7
Switzerland	0.9	1.1	0.4	0.6	5.5	0.8	1.1	6.0
Hong Kong	1.1	0.8	1.2	1.0	0.5	0.2	0.2	5.4
Germany	0.9	2.0	0.3	0.4	0.5	0.0	0.0	5.0
France	0.7	1.3	0.3	0.5	0.3	12.7	2.3	3.1
Other financial centres	0.9	1.0	0.3	0.6	0.3	0.4	1.8	19.0
								100

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, own calculations.

* This table indicates where the biggest market for a certain currency exists. It shows which part of total foreign exchange trading in a given currency is traded in which financial centre.

** The specialisation index measures to which extent the use of a currency is spread around the world, if the index is around 1 for every financial centre, the currency is evenly spread around the globe. This is especially the case for the dollar but also for the DM, the index is calculated by dividing the share of global use of a currency in a given centre by the share of global foreign exchange turnover conducted the centre. For example the specialisation index for the pound in London is: $47.9/26.6=1.8$.

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, (Annex Tables: Table 2-A, own compilation).

Interpretation: Of all foreign exchange trading involving the dollar 26% was traded in London.

Total adds up to 100%. The specialisation index factor for Paris in FF is calculated by dividing the share of foreign exchange transactions involving the FF in Paris (40%) by the share of the Paris exchange market in total exchange (3.1%), thus 12.7. Although only 3.1% of all global foreign exchange trading is conducted in Paris, Paris accounts for 40% of all trade involving the FF.

File: **Forex**

Worksheet: **Rel Size 1992**

Table 19: Local currency* transactions, per country and currency, in %

Category	1989				Total in billion US dollar	1992				Total in billion US dollar
	Local currency against:			Total		Local currency against:			Total	
	dollar	DM	Other			dollar	DM	Other		
United Kingdom	87.8	8.5	3.6	100	74.0	70.9	23.0	6.1	100	71.8
United States	na	31.1	68.9	100	167.0	NA	38.0	62.0	100	170.6
Japan	94.0	0.3	5.7	100	116.0	91.3	5.1	3.7	100	93.2
Singapore	75.0	0.0	25.0	100	4.0	92.1	0.8	7.1	100	2.4
Switzerland	68.3	26.8	4.9	100	41.0	64.4	24.0	11.7	100	31.6
Hong Kong	91.2	0.0	8.8	100	9.1	93.5	0.0	6.5	100	8.8
Germany	NA	NA	NA	NA	NA	72.2	NA	27.8	100	47.1
France	55.3	35.3	9.3	100	15.0	46.4	42.9	10.7	100	17.4

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1992, and April 1989.

* Local currency refers to the national currency of the country in which the financial centre is established, in London pound sterling is the local currency, in Paris the French franc.

Source: BIS, Central Bank Survey of Foreign Exchange Market Activity in April 1989 and 1992, (1992: Annex Tables: Table 2-D, 1989: Table C-2, p. 15).

Interpretation: In 1989, 87.8% of all foreign exchange transactions involving the pound sterling in London (local currency) were exchanged against the dollar. Total of transactions involving the pound was 74 billion US dollar.

File: Forex
Worksheet: Local Curr

3.3. Denomination of international financial assets

The store of value function of a currency is measured by the use of a currency for denomination of international bonds, Euro-notes, deposits and loans, see Table 1 on Page 10. This is exactly what has been done in the next set of tables.

Table 20 gives the composition of the world international private financial wealth portfolio. This portfolio is a stock and Table 20 shows the different parts of this portfolio. The analysis is based on the analysis in "One Market, One Money" Chapter 7. However, data about Euro-notes were not available before 1990 so they were left out of the portfolio that is considered in the analysis of "One Market, One Money". In Table 20B the share of a currency in the portfolio is divided by the share of the issuing country in OECD GDP. This index gives a measure of the extent to which a currency is used as a store of value. It can be more or less than that we might expect from the size of the issuing country.

Table 21 gives the denomination of international bonds by currency and type of issue. From this important part of the private wealth portfolio we have data on the division between fixed rate notes, floating rate notes and equity related. We can see that the dollar is relatively strong in the floating rate notes while other (European) currencies have a relative strong position in fixed rate issues.

Table 22 presents the distribution by currency of flows of external bonds and external bank loans. This table cannot be compared with the previous ones because it is based on OECD data while Tables 20 and 21 are based on BIS data.

Table 20: Composition and denomination by currency of the world private financial wealth portfolio, in %

	Dollar	Yen	EJ curr	DM	FF	pound	lira	guilder	ECU	SWF	Other	Total	Total*
I International bonds**													
1981	52.6	6.9	20.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20.3	100	194.0
1985	56.7	7.6	18.6	9.1	0.6	3.4	0.1	1.8	3.0	14.1	3.0	100	558.4
1988	43.9	12.1	25.0	9.4	1.2	6.8	0.3	1.9	4.2	12.7	6.4	100	1098.6
1989	45.3	10.5	26.0	9.7	1.5	6.6	0.6	1.8	4.4	11.2	7.0	100	1252.6
1990	41.1	11.4	29.0	10.0	1.3	8.1	1.0	1.7	5.1	11.9	6.7	100	1477.4
1991	39.1	12.2	32.0	9.6	2.8	8.3	1.5	1.6	6.1	10.5	6.2	100	1651.8
1992	40.3	12.3	32.4	10.0	3.8	7.2	1.4	1.7	6.0	9.2	5.8	100	1689.5
Sept 1993	38.3	14.1	33.4	10.3	4.6	7.8	1.6	1.9	5.2	8.4	5.8	100	1843.6
II Deposits at foreign banks***													
1981	71.7	1.6	16.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10.3	100	572.0
1985	70.2	2.6	19.4	9.9	1.8	3.0	0.5	1.0	0.8	3.7	4.1	100	553.8
1988	56.6	3.6	29.3	17.5	1.5	4.3	0.7	1.4	2.0	4.4	6.1	100	963.5
1989	51.3	3.0	34.3	15.3	2.9	9.2	1.2	1.9	1.6	4.9	6.5	100	1139.1
1990	43.6	3.5	39.4	17.1	4.0	10.4	1.6	2.1	1.9	6.0	7.5	100	1380.9
1991	41.0	3.0	42.5	19.3	3.8	10.7	1.8	2.3	2.2	5.2	8.3	100	1354.5
1992	40.1	2.6	45.7	23.1	4.4	9.0	1.6	2.8	2.3	4.7	6.9	100	1340.6
Sept 1993	38.0	2.8	47.3	24.6	4.8	8.6	1.7	2.9	2.1	4.5	7.4	100	1363.8
III Loans to residents made in foreign currency****													
1981	68.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	31.1	100	245.0
1985	69.2	3.8	16.2	9.3	1.4	0.9	0.3	1.0	2.9	8.3	2.5	100	562.9
1988	66.1	3.9	18.8	10.5	1.5	1.9	0.4	1.0	3.2	7.0	4.2	100	1020.4
1989	65.8	3.8	20.0	11.3	1.6	1.9	0.5	1.1	3.3	5.2	5.1	100	1142.6
1990	62.1	3.8	24.6	13.6	1.9	2.5	1.1	1.5	3.6	5.5	4.1	100	1305.8
1991	57.8	4.0	29.0	14.2	2.5	2.4	1.4	1.5	6.5	5.1	4.0	100	1221.5
1992	57.9	4.5	28.4	13.5	2.9	2.6	1.3	1.4	6.0	5.5	3.8	100	1154.3
Sept 1993	58.3	4.2	28.0	13.6	3.2	2.4	1.6	1.5	5.2	5.2	4.2	100	1134.1
IV Euro-note market*****													
1981	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1988	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1989	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1990	75.5	3.9	12.7	0.2	0.0	2.2	2.0	0.7	7.6	0.0	7.9	100	111.2
1991	66.4	5.7	23.2	1.2	0.1	2.8	4.9	5.8	8.1	0.0	4.7	100	152.3
1992	66.0	6.0	21.2	3.3	0.5	3.2	3.2	5.9	4.9	0.0	4.8	100	186.8
Sept 1993	60.7	8.5	22.8	3.9	1.0	5.1	4.2	5.0	3.2	1.1	6.9	100	234.6

Currency composition of total private wealth portfolio, in %

	Dollar	Yen	EU curr	DM	FF	pound	lira	guilder	ECU	SWF	Other	Total	Total*
1981	67.3	2.2	13.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.3	100	1011.0
1985	65.4	4.7	18.0	9.4	1.2	2.4	0.3	1.3	2.2	8.7	3.2	100	1675.1
1988	55.2	6.7	24.3	12.3	1.4	4.4	0.5	1.5	3.2	8.2	5.6	100	3082.5
1989	53.9	5.9	26.7	12.0	2.0	5.9	0.8	1.6	3.2	7.2	6.2	100	3534.3
1990	49.2	6.3	30.6	13.1	2.3	7.0	1.2	1.7	3.7	7.7	6.2	100	4275.3
1991	45.9	6.8	34.1	13.6	2.9	7.2	1.7	1.9	5.1	7.0	6.2	100	4380.1
1992	46.1	7.0	34.9	14.7	3.6	6.4	1.5	2.1	4.8	6.4	5.5	100	4371.2
Sept 1993	44.3	8.0	35.6	15.0	4.1	6.6	1.8	2.2	4.2	6.1	6.0	100	4576.1

Source: BIS; International banking and financial market developments, statistical annex, various issues.

* Total in billion of US dollar.

** Issue of May 1993; Statistical annex; table 12, p. 74-75, international bonds, amounts outstanding

*** Issue of May 1993; Statistical annex; table 4B, p. 20, cross-border liabilities in domestic and foreign currencies vis a vis non-banks, amounts outstanding.

**** Issue of May 1993; Statistical annex, table 3A, p. 14, asset position in foreign currency, amounts outstanding.

***** Issue of May 1993; Statistical annex, table 9, p. 69, Euro-notes, amounts outstanding.

Source: BIS, International Banking and Financial Market Developments, various issues. Using the issue of May 1993 as an example: I International bonds, in Table 12, p. 74-75, II Deposits at foreign banks, (cross-border liabilities in domestic and foreign currency), in Table 4A, p. 18-19, III Loans made in foreign currency to residents, (local positions in foreign currency, assets), in Table 3A, p. 14 and IV Euro-notes, in Table 9, p. 69.

Interpretation: In September 1993, 33.4% of the stock of outstanding international bonds was denominated in European currencies and the share of European currencies in the total portfolio was 35.6%.

File: Storev

Worksheet: Composition WP

**Table 20B: Index, currency share divided by share of issuing country
in OECD GDP**

	Dollar	Yen	<u>EU curr</u>	DM	FF	pound	lira	guilder	SWF	Other
1981	1.8	0.1	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	1.4	0.3	0.6	1.3	0.2	0.5	0.1	0.9	8.2	0.3
1988	1.6	0.3	0.7	1.4	0.2	0.7	0.1	0.9	6.3	0.6
1989	1.5	0.3	0.8	1.5	0.3	1.0	0.1	1.0	5.9	0.6
1990	1.5	0.4	0.8	1.4	0.3	1.2	0.2	1.0	5.6	0.6
1991	1.4	0.4	0.9	1.5	0.4	1.2	0.2	1.1	5.2	0.6
1992	1.4	0.4	0.9	1.5	0.5	1.1	0.2	1.2	4.9	0.6
Sept 1993	1.3	0.4	1.1	1.6	0.6	1.3	0.3	1.3	4.8	0.7

Source: BIS; International banking and financial market developments, various issues, the source OECD GDP; OECD, Main Economic Indicators.

Source: BIS, International Banking and Financial Market Developments, various issues. Using the issue of May 1993 as an example: I International bonds, in Table 12, p. 74-75, II Deposits at foreign banks, (cross-border liabilities in domestic and foreign currency), in Table 4A, p. 18-19, III Loans made in foreign currency to residents, (local positions in foreign currency, assets), in Table 3A, p. 14 and IV Euro-notes, in Table 9, p. 69. For the share of the different countries in OECD GDP; OECD, Main economic indicators.

Interpretation: The share of the dollar in the international private financial wealth world portfolio divided by the United States' share in OECD GDP amounted to 1.3 in September 1993. This means that the US dollar is more used for denomination of international investment assets than we can expect from its size measured by its share in OECD GDP. We assume that international investment assets are only denominated in national currencies of OECD countries, i.e. convertible currencies. In "One Market, One Money" (European Economy, No. 44, p. 187) the share of the EU in OECD GDP is regarded as a ceiling for the share of the European currencies in the portfolio.

File: Storev
Worksheet: WP rel to GDP

Table 21: Denomination of international bonds, by currency and type of issue

	Floating rate note			Fixed rate notes			Equity related		
	dollar	other	total*	dollar	other	total*	dollar	other	total*
1982	96.3	3.7	29.8	50.9	49.1	229.2	n.a.	n.a.	n.a.
1985	89.2	10.8	121.0	47.7	52.3	437.5	n.a.	n.a.	n.a.
1986	83.2	16.8	150.2	41.4	58.6	554.1	55.9	44.1	71.9
1987	74.7	25.3	157.8	34.0	66.0	711.9	54.7	45.3	121.1
1988	67.8	32.2	160.7	35.5	64.5	788.2	62.1	37.9	148.7
1989	64.5	35.5	167.9	35.5	64.5	860.9	66.4	33.6	160.4
1990	55.5	44.5	208.2	31.8	68.2	1010.7	65.6	34.4	258.4
1991	52.5	47.5	211.0	30.2	69.8	1158.9	65.6	34.4	281.9
1992	56.6	43.4	221.9	32.2	67.8	1212.2	64.7	35.3	254.5
June 1993	58.0	42.0	240.5	32.3	67.7	1322.7	58.9	41.1	214.6

Source: BIS, International banking and financial market developments, various issues, issue of May 1993, p. 61.

* Total in billion US dollar.

Source: BIS, International Banking and Financial Market Developments, various issues. Using the issue of May 1993, p. 61.

Definitions: Floating rate notes yield a variable yield, usually adjusted every 3 or 6 month with a rate based on LIBOR. Fixed rate notes yield a fixed interest rate. Equity related bonds are related with other instruments, like warrants. This linkage enables investors to benefit from a rise in the share price of the underlying value.

Interpretation: The far most important part is the segment of fixed rate notes with a total outstanding amount of 1322 billion US dollar. The share of the dollar in the segment of fixed rate notes is 32.3% in 1993.

File: Storev

Worksheet: IB by type

Table 22: Currency shares based on external capital market data, annual flows

Currency distribution of annual flow of external bond offerings*								
	1981-84	1985-87	1988	1989	1990	1991	1992	Aug-1993
US dollar	63.2	48.9	35.4	45.9	33.3	29.7	36.9	34.6
Japanese yen	5.7	11.1	8.7	8.7	13.5	12.6	11.2	9.0
European currencies **	13.2	20.5	30.6	25.0	35.9	40.3	39.0	41.8
<i>Deutsche mark</i>	6.3	8.2	11.6	7.5	8.3	7.1	10.4	11.8
<i>French franc</i>	0.0	1.3	1.4	2.4	4.3	6.1	7.5	8.1
<i>Pound sterling</i>	3.4	5.6	10.8	8.4	9.5	8.8	7.6	12.7
<i>Italian lira</i>	n.a.	n.a.	n.a.	n.a.	2.4	3.2	2.5	3.6
<i>Dutch guilder</i>	1.8	1.2	1.4	1.1	0.6	1.1	2.0	2.6
<i>Luxembourg franc</i>	n.a.	n.a.	n.a.	n.a.	2.0	1.9	1.7	0.9
<i>Peseta</i>	n.a.	n.a.	n.a.	n.a.	0.7	1.0	0.5	0.8
<i>ECU</i>	1.7	4.2	5.4	5.6	8.1	11.1	6.8	1.3
Swiss franc	14.7	11.6	12.5	8.7	10.5	7.1	5.8	5.7
Canadian dollar	1.6	2.5	5.9	4.6	2.7	7.2	4.7	7.1
Australian dollar	n.a.	2.9	3.4	2.3	2.2	1.4	1.5	0.8
Other	1.6	2.6	3.5	4.8	1.9	1.7	0.9	1.0
Total, in billion US \$	78.2	192.0	239.7	276.8	240.2	322.7	342.4	341.4

Currency distribution of annual flow of external bank loans***								
	1981-84	1985-87	1988	1989	1990	1991	1992	Aug-1993
US dollar	83.3	64.9	64.2	70.0	58.9	84.5	75.4	83.5
Japanese yen	5.9	15.1	6.1	5.3	1.7	1.1	1.4	0.8
European currencies **	6.1	14.6	23.5	19.7	32.9	10.2	18.7	8.9
<i>ECU</i>	1.3	3.9	3.3	4.9	8.7	3.9	15.0	2.1
<i>Pound sterling</i>	3.1	8.2	17.4	11.3	17.5	4.2	1.9	3.1
<i>Deutschmark</i>	1.7	2.5	2.8	3.5	6.7	2.1	1.8	3.7
Swiss franc	1.2	1.9	0.3	0.4	0.1	0.6	0.3	0.3
Other	3.5	3.5	5.9	4.6	6.4	3.6	4.2	6.5
Total, in billion US \$	78.8	62.8	129.3	126.8	127.1	117.7	118.6	94.2

Source: OECD Financial market trends, various issues (30-56).

* International issues, foreign issues and special placements, currencies converted into US dollar at constant (1990) exchange rates. Issue of October 1993, p. 60, external bond offerings, p. 85 external bank loans.

** Refers to the sum of the European currencies that are shown.

*** International and foreign bank loans, excluding loan renegotiations, issue of October 1993, p. 85, external bank loans.

NOTE: data for the period 1981-84 and 1985-87 are not comparable with subsequent years, average is taken over these periods.

Source: OECD, Financial Market Trends, various issues. Using the issue of October 1993 as an example: external bond offerings p. 60, external bank loans p. 85.

Definitions: International bond offerings include international issues, foreign issues and special placements. International issues are placed on the international capital market, bought by residents of various countries. Foreign issues are issued on the capital market of a given country in the domestic currency by a non-resident, the national rules concerning capital market issues are applied.

Interpretation: In 1992, total issues of external bonds offerings amounted to 342.4 billion US dollar of which 36.9% were denominated in US dollar and 39% in European currencies.

File: Storev
Worksheet: Flow data

4. International currency use by the official sector

As in the private sector, currencies are used in the official sector as a unit of account, a means of payment and a store of value. A currency is used as a unit of account to define exchange rate parities. A currency is used as a medium of exchange for intervention purposes. Official holdings of foreign currencies refer to the store of value function of international currencies. Although one can distinguish between the different functions, this does not mean that they are independent.

The holdings of official reserves depend on the choice of the currency of intervention. The currency of intervention depends on the exchange rate parity that the monetary authority wishes to maintain. The stability of the external value of a currency plays also a role.

Table 23 shows the use of the different currencies for denomination of exchange rate parities. This can be measured by the number of countries or the share of these countries in world GDP. The difference between the two methods of measuring pegs is striking. Another problem here is that a lot of countries are pegged to a basket of currencies. The composition of this basket is not presented in the IMF publications. Even if the basket would be known the question of how to measure a basket would cause a problem. Often countries have an informal peg to a currency which is not known. An example is the Dutch guilder and the Austrian shilling. These two currencies have in fact a peg to the DM. Similarly, the dollar is often used as a reference currency in Asia and the Western Hemisphere.

Table 24 presents some data on the use of currencies for intervention purposes. These data are estimations. Data on interventions are confidential and may not be published. However, Tavlas (1991) and Tavlas and Ozeki (1992) presents some estimations on interventions. The Federal Reserve Bank of New York publishes the interventions by the US Federal Reserve System Treasury in its quarterly reports.

Table 25 and 26 give the composition of the global foreign exchange holdings in the world and in selected regions respectively. The composition per region is presented by Tavlas (1991) and Tavlas and Ozeki (1992) and are made by the IMF staff. No other sources are available.

4.1. Currency of reference for defining exchange rate parities

Table 23: Share of different exchange rate regimes

	1975	by number of countries			Weighted by GDP*, in %	
		1981	1989	1993	1993**	1993
I Pegging						
<i>US Dollar peg</i>	65	41	39	23	26	1.4
<i>Sterling peg</i>	10	1	0	0	0	0.0
<i>French franc peg</i>	13	14	14	14	14	0.2
<i>Russian ruble peg</i>	0	0	0	7		
<i>Other currency peg</i>	4	3	4	6	6	0.0
<i>SDR peg</i>	0	15	8	4	3	0.1
<i>Own basket peg</i>	13	23	31	27	27	2.3
Total	105	97	96	81	76	4.0
II Limited flexibility						
<i>Snake/EMS</i>	6	7	8	9	9	17.4
<i>SDR peg with margins</i>	0	0	4	4	4	0.8
Total	6.0	7.0	11.9	13.0	13.0	18.2
III Other including float	17	35	45	73	75	77.9
Total no. of countries	128	139	153	167	164	164

Source: IMF, annual reports 1975, 1981, 1989 and 1993, 'Exchange arrangements and exchange restrictions' and CHELEM database for the GDP weighting, done by the CEPII, annex II, GDP weighting of peggings.

* NOTE: GDP weightings based on 1991, reliable statistics on GDP of the new independent states of the old Soviet Union are not available. Three of these new countries have chosen for a float, seven for a peg to the Russian rouble and Estonia for a peg to the Deutschmark so the % of floating regimes is slightly overestimated.

** Division in % of the number of countries on a comparable basis with the row of GDP weightings.

Source: IMF, annual reports, the table with the GDP weightings is provided by the CEPII, Paris.

Interpretation: In 1993, 26 countries were pegged to the dollar. In total 76 were having a peg. However, they account for 4% of all the countries considered if we weight their share by their GDP. The 76 countries having a peg accounted for only 4% of world GDP.

File: Off sector

Worksheet: Pegging

4.2. Intervention in foreign exchange markets

Table 24: Currency distribution of foreign exchange intervention, in%

	<u>Selected European countries*</u>			<u>U.S. Federal Reserve and Treasury</u>				
	<u>1979-82</u>	<u>1983-85</u>	<u>1986-87</u>	<u>1979-82</u>	<u>1983-85</u>	<u>1986-88</u>	<u>1990-91</u>	<u>1992-93</u>
US dollar	71.5	53.7	26.3					
EMS currencies	27.2	43.5	71.7					
<i>Deutsche Mark</i>	23.7	39.4	59.0					
Deutsche Mark	89.7	67.9	57.5	89.7	67.9	57.5	48.8	43.8
Japanese yen	10.3	32.1	42.5	10.3	32.1	42.5	51.2	56.3

Source: Tavlas (1991, p. 29); Federal Reserve Bank of New York, Quarterly Review, various issues.

* Refers to countries participating in the EMS.

Note: Total intervention includes both purchases and sales.

Source: European countries, and US intervention till 1988; Tavlas (1991, p, 29). US intervention 1990-93; Federal Reserve Bank of New York, Quarterly review. For example, Quarterly Review Autumn 1993, Vol. 18, No. 3, p. 51 where is mentioned that the US monetary authorities intervened a total of 1067.5 million US dollar against yen in the period from May to July 1993.

Interpretation: In the period 1979-82, 89.7% of all interventions conducted by the US Federal Reserve and Treasury were in DM.

File: Off sector
Worksheet: Intervention

4.3. Official holdings of foreign exchange

Table 25: Currency composition of global official holdings of foreign exchange*, in % of total holdings

	1973	1976	1979	1982	1985	1988	1989	1990	1991	1992
All countries										
US dollar	76.1	79.7	73.2	70.5	64.8	64.6	60.2	57.5	58.4	64.4
Pound sterling	5.6	2.0	1.8	2.5	3.0	2.7	2.7	3.4	3.6	3.2
Deutsche mark	7.1	7.0	12.0	12.3	15.1	15.6	19.0	18.6	16.5	13.0
French franc	1.1	0.9	1.3	1.2	0.9	1.0	1.4	2.3	2.8	2.5
Swiss franc	1.4	1.4	2.4	2.8	2.3	1.9	1.5	1.4	1.4	1.3
Dutch guilder	0.5	0.5	1.0	1.1	1.0	1.1	1.1	1.1	1.1	0.7
Japanese yen	0.1	0.8	3.6	4.7	8.0	7.7	7.7	8.8	9.4	8.1
Other	8.1	7.8	4.8	5.0	4.9	5.4	6.5	6.9	6.9	6.8
Industrial countries										
US dollar	86.3	87.0	83.5	77.1	65.2	67.7	59.6	56.0	55.8	64.9
Pound sterling	3.7	0.7	0.7	0.8	1.8	1.5	1.4	1.9	2.0	2.3
Deutsche mark	2.9	3.8	9.4	12.2	19.5	17.3	22.5	21.9	20.0	14.4
French franc	0.0	0.1	0.6	0.3	0.1	0.7	1.2	2.5	3.2	3.0
Swiss franc	0.8	0.9	1.4	1.7	2.1	1.7	1.1	1.1	0.8	0.6
Dutch guilder	0.3	0.3	0.6	0.7	1.0	1.1	1.2	1.3	1.2	0.5
Japanese yen	0.0	0.4	2.6	4.4	8.9	7.0	8.1	9.6	10.4	7.4
Other	6.0	7.0	1.2	2.8	1.4	3.0	4.8	5.9	6.5	6.9
Developing countries										
US dollar	55.0	72.8	62.9	63.8	64.5	57.4	61.3	60.7	62.7	63.6
Pound sterling	9.5	3.2	2.9	4.1	4.3	5.6	5.6	6.4	6.0	4.6
Deutsche mark	15.9	10.1	14.6	12.4	10.0	11.6	11.3	11.6	10.8	10.9
French franc	3.3	1.6	1.9	2.2	1.9	1.7	1.8	2.0	2.1	1.9
Swiss franc	2.6	1.9	3.4	3.8	2.6	2.5	2.3	2.2	2.2	2.5
Dutch guilder	0.9	0.7	1.3	1.6	0.9	0.9	0.8	0.7	0.8	0.9
Japanese yen	0.2	1.1	4.5	4.9	6.9	9.2	6.9	7.3	7.7	9.0
Other	12.6	8.6	8.3	7.3	9.0	11.1	10.0	9.0	7.7	6.7

Source: IMF, annual report, various issues, appendix I, table I.2, p. 107 in annual report April 30 1993.

* The SDR value of ECUs issued against dollars is added to the SDR value of dollars, but the SDR value of ECUs issued against gold is excluded from the total listed here.

Source: IMF, annual report

Interpretation: In 1992, 64.4% of all reported official holdings of foreign exchange were holdings of US dollar.

File: Off sector

Worksheet: Off Res World

Table 26A: Currency composition of official holdings of foreign exchange, in % of total holdings

	<u>Selected European countries</u>						
	1980	1982	1983	1984	1986	1988	1989
US dollar	80.2	80.9	77.1	72.9	71.3	63.7	57.9
Pound sterling	1.0	0.8		1.4	1.7	1.3	0.7
Deutsche mark	12.0	10.3	13.1	16.6	14.9	20.3	23.4
French franc	0.8	0.2		0.1	0.1	1.4	1.4
Swiss franc	1.0	1.6		1.8	2.1	2.2	2.1
Dutch guilder	1.0	1.0		0.8	1.1	1.0	1.2
Japanese yen	2.0	3.5	4.1	4.7	6.2	6.7	4.7
Other	1.9	1.8		1.8	2.8	3.4	8.7
Sum \$,DM,Y	93.2	92.0	90.2	90.9	87.9	85.3	82.0

Source: Tavlas, (1991, p. 33) and Tavlas and Ozeki (1992, p. 49), IMF Fund staff estimates.

Source: Members of the EMS; Tavlas (1991, p. 33) and Tavlas and Ozeki (1992, p. 49).

Interpretation: In 1989, 23.4% of all holdings of foreign exchange by members of the European Monetary System, were holdings of DM.

File: Off sector

Worksheet: Off Res Europe

Table 26B: Currency composition of official holdings of foreign exchange in selected Asian countries, in % of total holdings

	Selected Asian countries										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
US dollar	48.6	54.4	53.2	55.7	58.2	44.8	48.4	41.2	46.7	56.4	62.7
Pound sterling	3.0	2.5	2.7	2.9	3.5	4.1	3.6	3.9	4.2	6.4	4.9
Deutsche mark	20.6	18.9	17.6	16.7	14.6	16.4	16.7	16.7	17.4	15.2	14.2
French franc	0.6	0.6	0.7	0.8	0.6	0.9	1.1	1.0	0.5	0.5	0.2
Swiss franc	10.6	5.1	5.6	6.6	4.9	4.9	5.1	5.7	3.4	3.0	0.5
Dutch guilder	2.8	3.1	2.6	1.8	1.9	2.1	2.2	1.5	1.0	0.9	0.5
Japanese yen	13.9	15.5	17.6	15.5	16.3	26.9	22.8	30.0	26.7	17.5	17.1
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum \$,DM,Y	83.1	88.8	88.4	87.9	89.1	88.1	87.9	87.9	90.8	89.1	94.0

Source: Tavlas and Ozeki, (1992, p. 40), IMF, Fund staff estimates.

Source: Selected Asian Countries; Tavlas and Ozeki (1992, p. 40), IMF Fund staff estimates.

Interpretation: In 1989, 17.5% of all holdings of foreign exchange by selected Asian countries were holdings of Japanese yen.

File: Off sector
Worksheet: Off Res Asia

5. Annex I: Invoicing international trade

5.1. Introduction

This annex is linked with the Tables 2 to 8 that describe the currency denomination of international trade. The main aim of this annex is to explain how the estimations of the currency denomination of total world trade, presented in Table 2 to 8, are made.

Figure 2, Page 12 presents the links between the different tables on denomination of international trade. We have divided all world exporters in two groups. Group I is called "major exporting countries and OPEC¹". For these countries we have data on their invoicing pattern. Group II is called "Rest Of the World (ROW)²" and we do not have the exact use of the different currencies in these regions.

Section 5.2 discusses the use of currencies by each major exporting country of group I (Tables 2 and 3 and 4). However, the exact use of a currency in the trade of a country is not always known. In this case, estimates have been made to approximate the use of a currency for denomination of national exports or imports. Section 5.2 explains in detail how the estimates for the use of given currency in the exports or imports of a given country have been calculated and which assumptions have been made to make estimations possible. The assumptions and their implications are explained. The assumptions are supported with statistical evidence. The methodology that is used to apply these assumptions is presented in figure 2, see Page 61, and is illustrated with examples. Annex II gives a short description of every single estimate.

Section 5.3 describes how the invoicing behaviour of the major exporting countries and OPEC have been aggregated (Table 7B and 8B, Page 19 and 21). The share of each country in world

¹The major exporting countries comprise the United States, Japan, Germany, France, the United Kingdom, Italy and the Netherlands.

²The rest of the world is divided in six regions. This division is based on the division in different regions made by the International Monetary Fund (IMF) in the Direction of Trade Statistics (DOTS):

- 1) Countries that are member of the European Union (EU) or European Free Trade Association (EFTA) but are not one of the major European exporting countries.
- 2) Canada, Australia and New Zealand.
- 3) Asian countries that are not member of OPEC, so Asia excluding Indonesia.
- 4) African countries not included in OPEC.
- 5) Countries from the Middle East that do not belong to the OPEC.
- 6) Countries from the Western Hemisphere that are not member of OPEC.

exports is used in this exercise.

Section 5.4 presents assumptions on the invoicing behaviour of the countries of the rest of the world (ROW), group II because data on their invoicing behaviour are not available. On the basis of these assumptions, one has calculated the invoicing pattern of each region of the ROW, see Table 6 Page 17.

The next step is to aggregate the data about invoicing behaviour of group I and group II. This exercise is discussed briefly in Section 5.5. The results are Tables 7B and 8B (Page 19 and 21) that present the currency denomination of total world exports.

In Section 5.6 we conclude we a comparison of our results those of other authors.

5.2. Invoicing pattern per country (group I)

5.2.1. About the data, why assumptions

It is very difficult to estimate the denomination of world exports by currency for several reasons. First, data are not available for all countries, second, the data for the different countries are not always comparable because in some cases we have received data on payments (for example France) for imports and exports, in other cases our source was a survey of invoicing behaviour among exporters and importers. We have combined all these data to assess the denomination of imports and exports. The currency of payment is considered to correspond with the currency of invoicing.

Another difficulty is the lack of data for a part of the world, especially the developing world. This report attempts to solve this problem by the calculation of approximations at the country level and an aggregation of country-level data to the world level.

By using this methodology, we have got an insight into, first, the regional distribution of the global use of the different currencies, and second, the use of a currency per country or region.

We begin with the invoicing of exports and imports at the country level. Which currencies are used at the country level? The matrix with the percentages of the use of a currency for denomination of national imports and exports is called the invoicing pattern of a country.

5.2.2. Assumptions and implications

Even for those countries for which we received data about their invoicing pattern, we had to make estimations if the invoicing pattern was not complete, i.e. when the use of the main currencies was given, but not for all currencies. In this section we explain the three main assumptions made.

The currency of choice for invoicing international trade can be one of three currencies. It can be the importer's currency, the exporter's currency or a third currency (a so called vehicle currency). In several articles; Rao and Magee, (1980, p 369), Tavlas (1991, p. 7) and Tavlas and Ozeki (1992, p. 4) the dollar is mentioned as the main vehicle currency for denomination of international trade. The US dollar is the main currency used for denomination of exports of developing countries and primary commodities are mainly quoted in US dollar. Page (1981, p. 61) reckoned that 0.9% of world trade denominated in DM could be accounted for the role of the DM as a vehicle currency, respectively 0.5% for pound sterling. Scharrer (1979, p. 458) assumes that all currencies

except the dollar are only used for denomination of trade in which they are directly involved.

In our estimates we will also assume the dollar to be the only vehicle currency. This means that if we estimate the use of a currency, not being the US dollar, we assume that this currency only used for denomination of exports and imports of the issuing country. *It is the most important assumption because it limits the vehicle use to the US dollar.* Therefore we will carefully investigate this assumption with the most recent data that we have received.

In the remainder the following notation is used.

A, B, C=Country A, B, C

α, β, γ =Currency issued by country A, B, C

X=Exports

M=Imports

For example:

% $X^A_{to B}$ = share of exports of country A that are exported to country B

% $X^A_{to B \text{ in } \beta}$ =share of exports of country A to country B denominated in currency β

% of $X^A_{in \beta}$ =share of exports of country A that is denominated in currency β

Assumption I: The US dollar is the only vehicle currency used for denomination of international trade.

In other words, the share of *exports* of country A that is denominated in a certain *foreign currency* β equals the share of exports of country A to country B, multiplied with the share of the trade flow from country A to country B denominated in currency β .

The share of *imports* of country A denominated in *foreign currency* β equals the share of imports of country A from country B multiplied with the share of trade from country B to country A denominated in currency β .

$$\% X^A_{to B} \quad * \quad \% X^A_{to B \text{ in } \beta} = \quad \% \text{ of } X^A_{in \beta} \quad (1)$$

$$\% M^A_{\text{from B}} * \% M^A_{\text{from B in } \beta} = \% \text{ of } M^A_{\text{in } \beta} \quad (2)$$

The definition foreign currency here refers to all currencies except the domestic currency. Concerning imports (exports), the domestic currency is the national currency of the importer (exporter).

In other words, *a currency is only used for denomination of imports or exports of the issuing country*. Due to this assumption the estimation can underestimate the use of a certain currency if that currency is used as a vehicle for denomination of trade. Although no signs exist that another currency besides the US dollar is used significantly as a vehicle for denomination of international trade, we will carefully investigate this assumption. The roles of other candidates for a vehicle role, the DM and the yen, are examined.

The yen

On the precise use of the yen in South East Asia the information available is on invoicing of Japanese imports and exports (see annex II Page 80 with data on the denomination of Japanese imports and exports to the different regions). As a rather small percentage of 23% of Japanese imports from South East Asia is denominated in yen, it seems *very unlikely that the yen fulfils a vehicle role for denomination of trade between Asian countries*.

Data about invoicing in yen in Europe demonstrate that it is very unlikely that other (Asian) countries use the yen as a third currency for denomination of their trade to Europe. The yen is not used more, than we might expect from direct trade with Japan. I will illustrate this aim with an example (the box is taken from annex II, estimations of the denomination of French imports).

French imports from Japan:					
	% of French M from Japan source	*	% of Japanese X to France in yen source	=	% of French M in yen source
1981	2.3% IMF	*	31.6% (0.366/0.341)*0.294	=	0.7% estimation
1988	4.1% IMF	*	36.6% (0.015/0.041)	=	1.5% BdFrance
<i>Extrapolation from 1988 to 1981 with:</i>			<i>0.341% of Japanese X denominated in yen in 1988</i>		
			<i>0.294% of Japanese X denominated in yen in 1980</i>		

From data of Banque de France we know that in 1988 1.5% of French imports were denominated in Japanese yen. We also know that in 1988 4.1% of French imports were coming from Japan. If all yen-denominated imports were coming from Japan (i.e. assuming no vehicle role for the yen) we can calculate that in 1988 36.6% of Japanese exports to France were denominated in yen. This

is consistent with Japanese data on the share of Japanese exports to Europe denominated in yen (43.5%, see annex II, p. 80). We can conclude with rather high degree of certainty that the French imports denominated in yen were imports coming from Japan; other (Asian) countries have not used the yen for invoicing their exports to France. Probably they have used the FF or the US dollar.

Concluding, one might say that it is *very unlikely that the yen is fulfilling a vehicle role*. South East Asia countries invoice their exports to Japan mainly in dollar and data from Europe show that the yen is only marginally used, very likely only for direct trade with Japan.

The Deutsche mark(DM):

Are there any reasons to expect a vehicle role for the DM? If the DM is used as a vehicle this is probably in Europe where the DM is most dominant. Suppose we expect that the DM is used as a vehicle for denomination exports to France. Fill in formula (2) for the year 1992.

French imports from Germany:					
	% of French M from Germany source		% of German X to France in DM source	=	% of French M in DM source
1992	18.6% IMF	*	62.9% (0.117/186)	=	11.7% BdFrance

From the IMF (DOTS) we know that 18.6% of French imports come from Germany. Data from the Banque the France tell us that 11.7% (see annex II) of French imports are denominated in DM. Assuming no vehicle role for the DM, we may apply formula (2), and we see that 62.9% of German exports to France is denominated in DM. From the Deutsche Bundesbank (annex II, Page 81) we know that, in 1992, 77% of German exports is denominated in DM, i.e. the average use of the DM for denomination of German exports is 77%. Considering that the FF is a currency that is relatively strong in denomination of imports (a rather strong domestic currency), a share of 62.9% of German exports to France denominated in DM corresponds with an average use of 77%.

If Italian, Portuguese or Dutch exporters also invoice their exports to France in DM (use the DM as a vehicle) the percentage of French imports denominated in DM would have been much higher than 11.7%. A share 11.7% of French imports invoiced in DM corresponds with a 62.9% invoicing in DM. German exporters invoice 62.9% of their exports to France in DM. If more than 18.6% of French imports were denominated in DM, clearly the DM would have been used as a vehicle. The percentage of imports denominated in DM would be higher than is possible from German exporters alone. The German exporters alone account by maximum (if 100% of German exports to France were denominated in DM) for 18.6% of French imports denominated in DM.

This example has shown that it is very unlikely that the DM is used as a third currency for denomination of French imports.

Now we consider invoicing of Italian imports. What about invoicing of imports of Italy that possesses a minor international currency, the Italian lira.

<u>Italian imports from the Netherlands:</u>					
	<u>% of Italian M from Germany</u>		<u>% of German X to Italy in DM</u>		<u>% of Italian M in DM</u>
	source		source		source
1992	21.3% IMF	*	75.0% (0.16/0.213)	=	16.0% Banca d'Italia

Filling in formula (2) tells us that 75% of Italian imports from Germany are denominated in DM. So also here we do not see a vehicle role for the DM in denomination of Italian imports.

The US dollar:

However, for the dollar, we clearly see a vehicle role. Only 5.2% of Italian imports are imported from the United States (DOTS Yearbook 1986-92, p. 235). However, 26% of Italian imports are denominated in US dollar.

<u>Italian imports from the US:</u>					
	<u>% of Italian M from the US</u>		<u>% of US X to Italy in US dollar</u>		<u>% of Italian M in US dollar</u>
	source		source		source
1992	5.2% IMF	*	500.0% (0.26/0.052)	=	26.0% Banca d'Italia

This means that at least 20.8% of Italian imports in dollar were not coming from the US.

Similarly, the share of French imports from the US amounts to 8.4% while the share of imports denominated in dollar is 23.1%. This implies that at least 14.7% of the French imports that are denominated in dollar are not coming from the US but from other countries. In France the dollar is playing a less important vehicle role than in France.

If we look at the world level, the vehicle role of the dollar in Europe is relatively small. In Less Developed Countries (LDC's), but also in Canada, New Zealand and Australia, often more than 50% of exports are denominated in dollar. Data from the Japanese Ministry of International Trade and Industry (MITI) show that in 1993 74.8% of Japanese imports from south east Asia were invoiced in US dollar. Data about invoicing by LDC's are scarce. However, the available data from Page (1981, p. 60) and Kenen (1983, p. 20) show that for denomination of trade in LDC's the dollar is playing a dominant role. This dominant role for the dollar is reflected in our estimates

about invoicing behaviour in LDC's, see assumptions about invoicing behaviour in the ROW, Page 70.

Assumption II: The use of a currency in trade with a certain country varies proportionally with the use of the currency in trade with all trading partners.

We use this assumption when we have the exact use of a currency for one year but not for the year desired. This was for example the case for France. The currency breakdown was insufficient before the year 1988. In this case we may extrapolate the use of a currency over time. If the use of a currency grows 10%, its use has grown in its trade with all trading partners. In an extrapolation, the estimate is adjusted for two changes:

- | |
|--|
| <ol style="list-style-type: none">1) change in the share of exports or imports of country A to country B from one year to another.2) change in the general use of a currency β for denomination of imports and exports of country B. |
|--|

Example 3 on page 63 provides an illustration of this assumption.

Assumption III: The percentage of total imports (exports) denominated in domestic currency is a good indicator of the percentage of imports (exports) from any country denominated in domestic currency.

This assumption says that when 34% of the Italian imports are invoiced in Italian lira, this 34% is a good indicator of the use of the lira to denominate Italian imports from Belgium, Germany, France the United States or Japan. In most cases this will be a good indicator. However, for imports coming from countries that issue a very strong currency, we would probably overestimate the use of the importer's currency and for imports that are coming from a LDC with an inconvertible currency this indication will underestimate the use of the importer's currency. Let me illustrate this with an example.

German imports from France:					
	% of German M from France source		% of German M from France in Franc source		% of German M in Franc source
1992	17.3 % IMF	*	17.9 % (0.031/0.173)	=	3.1 % BUBA

Dutch imports from France:					
	% of Dutch M from France source		% of Dutch M from France in Franc source		% of Dutch M in Franc source
1992	4.8 % IMF	*	77.1 % (0.037/0.048)	=	3.7 % DNB

We know that in 1992:

- about 17.9% of French exports to Germany were invoiced in FF
- about 77% of French exports to the Netherlands were denominated in FF (filling in formula (2) as done earlier in this section).
- the average of French exports denominated in FF is 54.6%.

From this exercise it is clear that the FF is more used for the denomination of French exports going to the Netherlands than for the denomination of French exports to Germany. Should we estimate the use of the FF for denomination of French exports to Germany by the average use of the FF of 54.6%, we would certainly overestimate the use of the FF. However for French exports destined to the Netherlands 54.6% underestimates the use of the FF. Before we apply assumption III, we take account of this effect by posing question 4, see figure 2 on the next page.

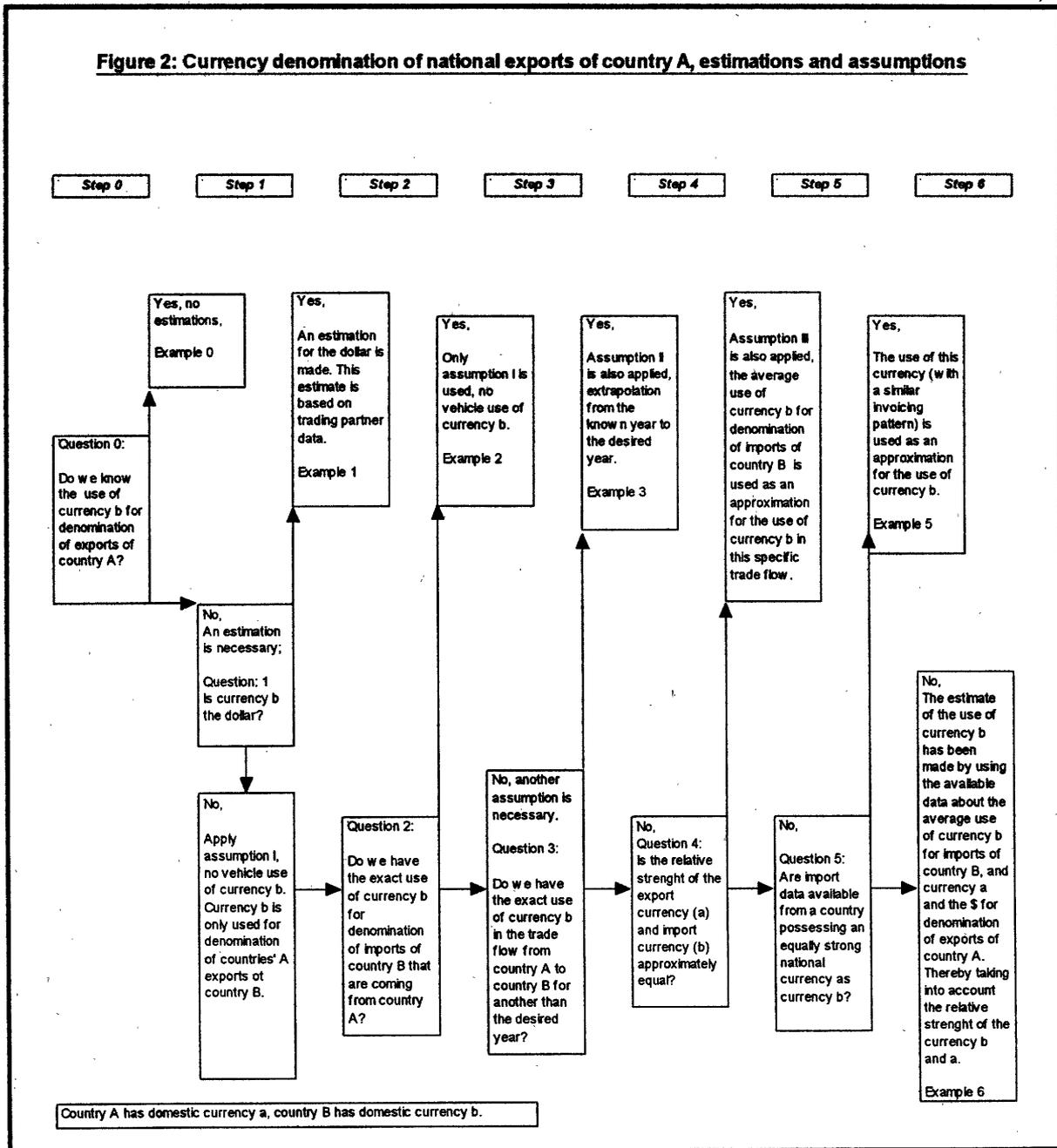
Estimates made by Black (1991, p. 523) are used for denomination of trade by OPEC Countries. Table 6 (Page 17) presents the invoicing patterns of the six regions of the ROW and OPEC countries.

In the next section an example is given of the different sorts of estimations.

5.2.3. Methodology and examples of estimations

This paragraph presents the overall structure of the estimations. Figure 1 gives an overview of the different estimations. A question is posed at every step in the tree. Based on the response an estimation may or may not be made. The sequence is also of importance because this sequence indicates the priority of the assumptions.

The examples are numbered. An example of every type of estimation is given below. The methodology of example 2 is considered as best as it is based on the weakest assumptions. The higher the number of the example, the stronger the assumptions used have become. The only exception is example 1, the estimation of the use of the dollar. This is a difficult estimation because the dollar fulfils an important vehicle role (see example 1 for an explanation).



Example 0: no estimation

The complete currency denomination is known and no estimation had to be made. This is the case for France, Germany and the Netherlands for several years. If a space is left open (see the Belgian franc below), the currency's use is not known and included under "other".

Currency denomination of French exports, in %												
	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1992	16.5	0.8	10.4	<u>54.6</u>	4.1	3.3	1.5		1.1	0.7	7.0	100.0

Example 1: estimation of the use of the dollar

An estimation of the use of the dollar is necessary because assumption I does not apply to the dollar. As we have already seen in the previous paragraph, many countries use the dollar as a vehicle currency. If we would assume that the dollar was only used in trade with the US (Assumption I) we would underestimate the use of the dollar significantly. However, all the countries we have considered, Japan, Germany, France, the UK, Italy and the Netherlands, except the US, give the share of the dollar for denomination of their imports and exports. Only the use of the dollar by the US itself had to be estimated³. The data from Page (1981) for the year 1980 have been extrapolated. Take the use of the US dollar for the year 1992, Page 74.

Currency denomination of United States' exports, in %												
	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1992	<u>92.0</u>	1.5	1.3	0.9	0.9	0.4	0.6				2.4	100.0

The underlined numbers refer to estimates. First trading partner data that specified the invoicing pattern of their imports and exports to the US have been analysed. Data are available from the UK, Japan and the Netherlands. These data indicate which percentage of their exports to and imports from the US is invoiced in dollar and which percentage is invoiced in their own currency. After having estimated the use of major currencies for denomination of trade with the US (see estimations US exports and imports, Page 74), and a realistic percentage for others, the share of the dollar is calculated as a residual. The percentages of US imports and exports that are denominated in "other" currencies refer to the use of other currencies than the dollar, yen, DM, franc, sterling, lira and guilder that are used to denominate trade to the US. These "other" include for example the Austrian shilling, the Scandinavian currencies, the Canadian and Australian dollar. These currencies are slightly used to denominate trade with the US.

The data from Page (1981) show that a very high percentage of US imports (85%) is denominated in US dollar. The exporter's currency can be used, or the importer's currency (the US dollar) because there is no other vehicle currency than the US dollar. Thus all trade from LDC's is invoiced in dollar.

³The bureau of labor statistics expects to release data during the year 1994 for denomination of US exports and imports. A problem occurred with the implementation of a new computer system.

Example 2: estimation, using assumption I

This is for example the case for the estimation of the share of US imports denominated in yen.

US exports to Japan:			% of Japanese M from US in yen		% of US X in yen	
	% of US X to Japan	source		source		source
1992	10.7%	IMF	*	13.8%	MITI	= 1.5% estimation

We know that in 1992 10.7% of US exports were going to Japan. The data from the Japanese MITI show that in 1992 13.8% of the Japanese imports from the US (see annex II, Page 80) were denominated in yen. This is the same as saying that 13.8% of the US exports to Japan were denominated in yen. Thus we can calculate the share of US imports denominated in yen by applying assumption I (Only US exports to Japan are denominated in yen). The result is that 1.5% of US exports are denominated in yen.

Example 3: extrapolation with assumption I and II

Sometimes we have the exact share of exports denominated in a given currency for a given year but not for all years. In this case the share of a currency has been extrapolated to the desired year in the following way.

In an extrapolation, the estimate is adjusted for two changes:

- 1) change in the share of exports or imports of country A to country B from one year to another. (e.g. the share of French exports to Italy accounts for 10.9% in 1981, against 11.7 in 1988)
- 2) change in the general use of a currency β for denomination of imports and exports of country B. (e.g. the share of Italian exports denominated in lira in 17% in 1981, against 0.28% in 1988)

If a currency becomes used more often for the denomination of the issuing country's exports (imports), we assume that this also applies to the country's exports (imports) from any other country (assumption II).

The following box illustrates the estimation of the share of French exports denominated in Italian lira in 1981.

French exports to Italy:					
	% of French X to Italy		% of Italian M from France in lire		% of French X in lire
	source		source		source
1981	10.9% IMF *		13.5% (0.222/0.28)*0.17	=	1.5% estimation
1988	11.7% IMF *		22.2% (0.026/0.117)	=	2.6% BdFrance
	Extrapolation from 1988 to 1981 with:		0.28=% of Italian M denominated in Lire in 1988		
			0.17=% of Italian M denominated in Lire in 1981		

In 1988 the share of French exports denominated in Italian lira was 2.6%. The share of French exports going to Italy amounted to 11.7% in 1988. As we do in the example 2, we assume that the Italian lira is not used for denomination of French exports that are not going to Italy (assumption I). So in 1988, 22.2% (2.6%/11.7%) of the French exports to Italy in 1988 were denominated in Italian lira. The average of Italian imports denominated in Italian lira was 28% in 1988 and 17% in 1981. A relatively low share (less than the Italian average of 28%) of Italian imports from France is denominated in Italian lira. Taking this difference from the average in the bilateral trade relation into account and applying assumption II we can now make the extrapolation from 1988 to 1981; $22.2\%/28\% * 17\%$ equals 13.5%. In 1981, 13.5% of French exports to Italy (or Italian imports from France) were denominated in Italian lira. Multiplying this with the share of French exports destined to Italy (part A, 10.9%) in 1981 makes 1.5% (10.9%*13.5%).

Example 4: estimation with assumption I and III

If we look at the figure giving the sequence of the assumptions we see that in example 4 assumption I is already applied. Moreover we do not have the exact currency denomination of the trade flow between the countries concerned, nor we have the exact use of the currency for another than the desired year. In countries having approximately equal strong currencies we can take the average use that national currency is used for denomination of national imports and exports as an estimate for the use of the national currency in a specific trade flow of two countries. An example can make this clearer. Now we consider the estimation of the use of the FF for denomination of Japanese exports in 1980. (The estimates for 1987 and 1992 have been made equally) We make the assumption that Japanese exporters only use the FF for denomination of their exports to France (assumption I).

Japanese exports to France:					
	% of Japanese X to France		% of French M in Ffranc		% of Japanese X in Ffranc
	source		source		source
1980	1.6% IMF *		37.1% BdFrance	=	0.6% estimation
1987	1.8% IMF *		48.6% BdFrance	=	0.9% estimation
1992	1.9% IMF *		46.7% BdFrance	=	0.9% estimation

From the IMF (DOTS Yearbook 1980-86, p. 243) we know the value of Japanese exports to

France which amount to 1.6% (2.032/130.435, part A) of the value of total Japanese exports. The data from the Banque de France tell us that in 1980 37.1% of French imports were denominated in FF. Now we apply assumption III, i.e. 37% is a good estimate of the share of Japanese exports to France denominated in FF. The result is that the percentage of Japanese exports denominated in FF amounts to 0.6% (1.55% * 37.1%) of total Japanese exports.

Example 5: invoicing like a country possessing a similar invoicing pattern

In some cases assumption III cannot be used because we have to do with a trading partner possessing a dominant currency in denomination of international trade. Dominant here refers to the dollar, the DM and pound sterling in the beginning of the 1980s. The exact use of the currency for another year was not available so an extrapolation over time was not possible. However, the use of another currency that possesses a similar invoicing pattern in trade with that dominant currency issuing country is known. Now we consider the use of the Italian lira for denomination of US exports.

US exports to Italy:							
	% of US X to Italy			% of Italian M in lire		% of US X in lire	
		source			source		source
1980	2.5%	IMF	*	8.8%	like the Netherlands	=	0.2% estimation
1987	2.2%	IMF	*	11.9%	like the Netherlands	=	0.3% estimation
1992	1.9%	IMF	*	19.2%	like the Netherlands	=	0.4% estimation

In this case, the use of the Dutch guilder is used as an estimate for the use of the Italian lira by US exporters.

Example 6: estimation with assumption I and estimate of the use of a currency for denomination of a specific trade flow.

If not even an invoicing pattern of a similar country was known, like in example 5, then the use of a currency was estimated in the following way. The two currencies of the bilateral trade relation are compared with each other in their average use for imports and exports and the average use of the US dollar as a vehicle. The 100% is divided between the importer's currency, the exporter's currency and the dollar. This is for example what has been done in the case of UK exports to the Netherlands (see estimations UK, Page 86).

UK exports to the Netherlands:							
	% of UK X to the Netherlands			% of Dutch M from UK in guilders		% of UK X in guilders	
		source			source		source
1980	8.1%	IMF	*	12.0%	estimate	=	1.0% estimation
1987	7.3%	IMF	*	25.0%	estimate	=	1.8% estimation
1992	7.8%	IMF	*	30.0%	estimate	=	2.3% estimation

Here the use of the Dutch guilder for denomination of Dutch imports from the UK is estimated. Considering the invoicing patterns of the Netherlands and the UK in the years 1980, 1987 and 1992, an estimate is made of the use of the guilder in each year. In 1980 the estimated use of the guilder for denomination of UK exports to the Netherlands was 12%, in 1987 this percentage was estimated at 25%. How are these numbers derived? The average use of the pound sterling for denomination of UK exports amounted to 76% in 1980 and 57% in 1987, see annex Page 86. The average use of the Dutch guilder for denomination of Dutch imports was 25.1% in 1980 and 33.4% in 1987, see annex Page 92. The average use of the dollar for denomination of UK exports amounted to about 17% in 1980 and 20% (for trade to Western Europe) in 1987. If we apply assumption III and consider that 25.1% of Dutch imports from UK are denominated in guilder, we obtain the following distribution of UK exports.

Denomination of UK exports to the Netherlands in 1980:

25.1%	Average use of the guilder for denomination of Dutch imports
76%	Average use of the pound sterling for denomination of UK exports
17% +	Average use of the US dollar for denomination of UK exports
118.1	Sum of the average uses of the pound sterling, guilder and dollar

The use of these three currencies together should make 100%. However, it adds up to more than 100%, namely 118.1%. In the year 1980 the pound is assumed to be still rather dominant and that the use of the guilder in denomination of Dutch imports from the UK to be less than the average use of the guilder for denomination of Dutch imports. The use of the guilder is judged⁴ to have been 12%.

Denomination of UK exports to the Netherlands in 1987:

33.4%	Average use of the guilder for denomination of Dutch imports
57%	Average use of the pound sterling for denomination of UK exports
20% +	Average use of the US dollar for denomination of UK exports
110.4	Sum of the average uses of the pound sterling, guilder and dollar

However, in 1987 the role of pound had declined significantly while the guilder had become used

⁴The estimated use of the guilder varies between 7% (25.1 - 18.1) as a minimum and 25.1 as a maximum. It is most probable that the guilder was used less than average and sterling also. However, the use of the guilder could also have been estimated at 10% or 20%.

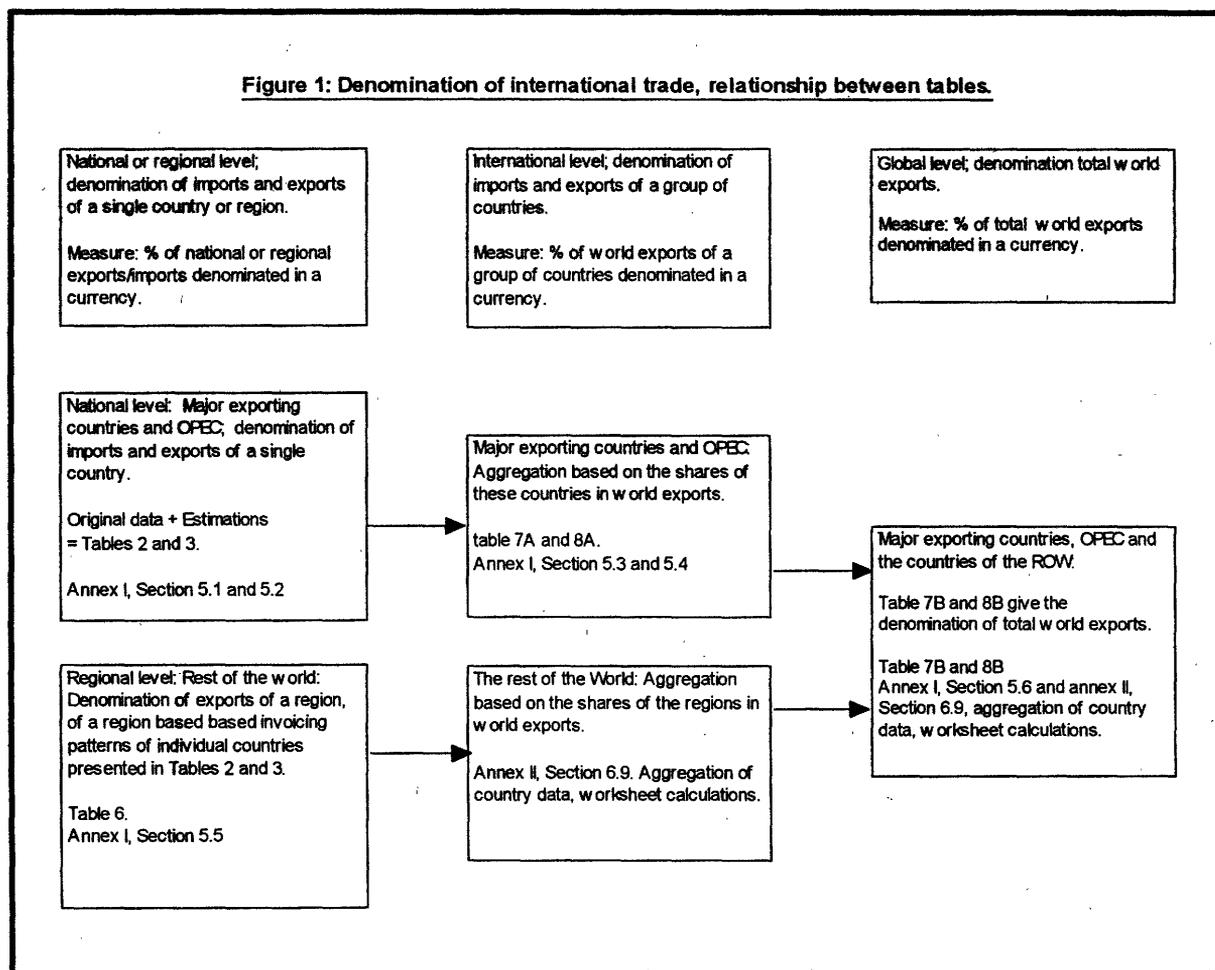
more frequently. We decided that approximately 25% of the UK exports to the Netherlands were denominated in guilder. This is our subjective judgement.

Now we have seen an example of every type of estimation. In annex II, all estimations are described in detail. The original data of the different countries are also presented in annex II. Underlined numbers refer to estimates. The invoicing patterns of the different countries are the result of the received data and the estimations. The invoicing patterns per country are presented in the Tables 2 and 3 on Page 13 and 14.

5.3. Aggregation of invoicing patterns of individual countries

This section describes how the denomination of world exports is derived from Table 2 on the denomination of national exports. We know the shares of the different countries and regions in world exports (IMF, DOTS). By multiplying the matrix of denomination of exports of a country (invoicing pattern, presented in Table 2) with the share of a country in world exports one gets the use of a currency in percentage of world exports due to trade of the country concerned, see annex II, worksheet calculations, Page 95.

Figure 2 gives the relationship between the different tables on the denomination of international trade.



In equation form:

$$\% \text{ of } X^A \text{ in } X^{\text{WORLD}} * \% \text{ of } X^A \text{ in } \alpha = \% \text{ of } X^{\text{WORLD}} \text{ in } \alpha \quad (3)$$

$\%$ of X^A in X^{WORLD} = share of exports of country A in world exports
 $\%$ of X^A in α = share of exports of country A denominated in currency α
of X^{WORLD} in α = share of world exports denominated in α due to exports of country A

The share of exports of country A denominated in currency α has been calculated in Section 5.2. with equation (1). When we make this multiplication for every country and every currency we get the total share of a currency in world trade. The calculations are presented in the *Lotus* worksheet "calculations" in annex II, Page 95.

5.4. Denomination of exports of major countries and OPEC (Table 7B)

This section illustrates the denomination of exports of group I in percentage of world exports from that of the individual countries. From the IMF (DOTS) we know the share of each country in world trade. For example, in 1980, the share of Germany in world trade amounted to 10.23% and 82.30% of German exports were denominated in DM. Multiplying 0.1023 with 0.823 makes 0.0842 and thus 8.42% of world trade is denominated in DM due to German exports. In 1980, 7.2% of German exports were denominated in dollar. Consequently, 0.74% ($0.072 * 0.1023$) of world exports were denominated in dollar due to denomination of German exports. The share of the dollar has been summed for all countries and you arrive at the use of the dollar as a percentage of world exports. However, exports of these seven countries and OPEC account only for about 60% of world export. Table 7A and 8A present the results of this aggregation.

The calculations are presented in annex II, Section 6.9., Page 95.

5.5. Denomination of exports in the rest of the world (Group II)

This section treats the estimation of the denomination of trade by the ROW. In order to estimate this figure it is necessary to make extrapolations for regions of which no data about currency denomination of trade exist.

The part of the world for which we have no data on its invoicing behaviour, i.e. the rest of the world, has been divided into six regions. For each region we have made assumptions on its invoicing pattern. Below, the six regions are listed together with the assumptions about their invoicing pattern. The *Lotus* worksheet "Formulas" in annex II, section 6.9.2 gives formulas used for the estimations. The listing below explains the assumptions made for the six regions of the ROW.

- 1) Rest of the EU and EFTA: behave like Europe 5⁵ (E5), the use of the currency by the issuing country is excluded from the average. Thus, an estimation of the use of the DM in the rest of the EU and EFTA is based on its average use in Europe 4 from which Germany is excluded. The use of the dollar and the yen is the average of Europe 5.
- 2) Canada, Australia and New Zealand: behave like Japan (J) and the USA (US); $((J+2*US)/3)$, For the use of the yen separate estimations have been made (see annex II, Page 94) because we have to adjust for the fact that the yen is the national currency of Japan and we have assumed that the yen does not fulfil a vehicle role. The use of the dollar in this region is quite dominant. Scharrer (1979, p. 457) estimated that the dollar accounts for 80% of Canadian exports and 70% of Australian and New Zealand exports. Page (1981, p. 60) came to a similar estimate with a share of 85% in Canada and 70% in Australia. Our estimate is a use of the dollar of 85.9% in this region in 1980.
- 3) Asia: behaves like US and Japan; $((J+2*US)/3)$; For the use of the yen separate estimations (see annex II, Page 94) have been made because the yen is the national currency of Japan and it is assumed that the yen does not fulfil a vehicle role in Asia. Page (1981, p. 60) estimated the use of the dollar in "Other Developing countries" (Asia, Western Hemisphere, Africa and Middle East) at 85%, while Scharrer (1979, p. 457) estimated the use of the dollar in the "Rest of the World" (Asia, Africa and Middle East) at 70%. Our estimate results in a use of the dollar of 85.9%.
- 4) Africa: Behaves like USA and Europe; $((2*US+E5)/3)$; No invoicing in domestic currencies, a large part of their exports are primary commodities that are usually quoted in US dollar. Our estimate comes to a use of the dollar at 70.1% compared with 85% and 70% from Page and Scharrer respectively.
- 5) Middle East: behaves like OPEC, no invoicing in the domestic currencies. We use Black's estimates, who estimated the use of the dollar in 1980 at 96%. Page (1981, p. 60) estimated the use of the dollar for the OPEC countries at 100%, Scharrer (1979, p. 457) at 95%.
- 6) Western Hemisphere: Behaves like USA and Europe; $((3*US+E5)/4)$, very few invoicing in domestic currency. Many exports of primary commodities, largely destined for North America. No strong home currency, so vehicle use (dollar) or importer's currency. Page (1981, p. 60) estimated the use of the dollar in this region about 85%, Scharrer (1979, p. 457) also. Our assumption results in a use of the dollar in of 76.6% in 1980.

⁵Refers to the 5 biggest European exporters, Germany, France, Italy, UK and the Netherlands.

5.6. Denomination of total world trade

By adding the exports of the major exporting countries and OPEC with the exports of the six regions of the ROW we get total world exports. The invoicing patterns of the different countries or economic regions are known or have been estimated. Multiplying the invoicing patterns with the corresponding share in world trade leads to an estimation of the use of the dollar, yen, DM, FF, pound sterling, Italian lira and the Dutch guilder for denomination of world exports. This aggregation is presented in annex II, Page 95.

5.7. Conclusions about estimations on denomination of international trade

The estimates of the invoicing patterns of individual countries can be considered as reliable. They are based on the assumption that vehicle use is limited to the US dollar. We have seen in Section 5.2 that this assumption is very likely to be true. Moreover, the estimates mainly concern estimations of the use of a minor currency, used as a foreign currency for denomination of trade of a particular country.

However, the invoicing pattern of the United States posed us some problems. No data are available yet at the Department of Labour Statistics (DOLS) in the United States. We had to rely on data (estimations in fact) from other authors, mainly Page (1981) and Black (1991). This problem will be solved over the course of the year 1994 when the DOLS expects to release data about invoicing behaviour in the United States.

The assumptions about invoicing behaviour in the six regions of the ROW of which we have no data are intuitive and open to discussion. However, the results have been compared with estimates about invoicing behaviour from other authors in these regions, see Page 70. Our estimates of the dollar, which are extrapolations based on the existing data of seven major exporting countries, have been compared with estimations from Page (1981) and Scharrer (1979) for the use of the dollar in the regions of the ROW, see previous paragraph. References for the use of other currencies in these regions are not available.

Another comparison was possible; *a comparison of total world exports denominated in a currency.* The next box gives a summary of the comparisons with estimations from others.

**Denomination total world exports, estimations of different authors,
in % of world exports**

Author	Scharrer	Scharrer	Page	Van de Koolwijk	Chevassus	Chevassus	Van de Koolwijk	Rogowski	Van de Koolwijk
	1978	1977	1979	1980	1980	1988	1987	1987	1992
US dollar	52.0	51.0	54.8	56.1	55.0	44.0	47.9	48.2	47.6
Japanese yen	1.7		2.3	2.1			4.0		4.8
Deutsche Mark	14.1		14.4	13.6			16.1		15.3
French franc	6.5		6.4	6.2			6.5		6.3
Pound sterling	6.5		7.5	6.5			5.5		5.7
Italian lire	2.4		1.9	2.2			3.2		3.4
Dutch guilder	3.6		3.0	2.6			2.8		2.8
Sub-total	86.8		90.3	89.4			86.0		85.9
Belgium franc	2.7		2.6						
Swiss franc	2.1		2.1						
Swedish krona	1.8		1.7						
Schilling	0.9		0.8						
Danish krona	0.9		0.8						
Irish pound			0.3						
Finnish marka			0.0						
Total	95.2		98.6						

Source: Scharrer (1979, p. 458), Page (1981, p. 61), Chevassus (1989), Rogowski (1994, p. 26), Van de Koolwijk (1994, Table 7)

The estimations on the denomination of world exports have been compared with other estimations for the years 1980 and 1987 by Page (1981), Scharrer (1979), Chevassus (1989) and Rogowski (1994). The outcome of these estimations is a share of the dollar of about 55% (Page, Chevassus), 14% for the DM and 6% to 7% for the pound and the FF in 1980. In 1987, the share of the dollar is estimated between 44% and 48% (Chevassus, Rogowski). Empirical evidence shows that the invoicing behaviour of a country only changes gradually. This characteristic of denomination of international trade makes it possible to compare invoicing patterns from different years.

6. Annex II: Description of the estimates and received data

The tables and boxes in this appendix present:

- The data provided by the the Japanese MITI, the Central Statistical Office in the UK and the central bank of Germany, France, Italy and the Netherlands.
- A brief description of the estimates made which are based on the assumptions explained in Annex I. The calculations in the boxes show exactly which assumptions have been made and which sources have been used.

The figures concern the major exporting countries only. They are grouped per country and divided between estimations of the currency denominated⁶ at imports and exports. These figures explain the results presented in the Tables 2 and 3.

Some remarks on the data are given per country, thereby addressing the main problems associated with every country.

All the descriptions of the estimates are recorded in Lotus:

File: Estimate.

The individual invoicing patterns are recorded in:

File: Invoice

Worksheet: Inv per country

⁶In the figures is often used the word "in", however, it refers to the words: "denominated in". So if is written "% of US M in yen" it is meant to say, "the share of US exports that is denominated in Japanese yen."

6.1. The United States

Currency denomination of United States' exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	<u>96.0</u>	<u>0.2</u>	1.0	<u>0.7</u>	1.0	<u>0.2</u>	<u>0.3</u>				<u>0.6</u>	100.0
1987	<u>93.0</u>	<u>0.8</u>	<u>1.2</u>	<u>0.8</u>	<u>0.9</u>	<u>0.3</u>	<u>0.4</u>				<u>2.6</u>	100.0
1992	<u>92.0</u>	<u>1.5</u>	<u>1.3</u>	<u>0.9</u>	<u>0.9</u>	<u>0.4</u>	<u>0.6</u>				<u>2.4</u>	100.0

Currency denomination of United States' imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	<u>85.0</u>	1.0	4.1	1.0	1.5	<u>0.5</u>	<u>0.2</u>				<u>6.7</u>	100.0
1987	<u>80.0</u>	<u>3.2</u>	<u>5.6</u>	<u>1.3</u>	<u>1.6</u>	<u>0.8</u>	<u>0.3</u>				<u>7.2</u>	100.0
1992	<u>80.0</u>	<u>3.0</u>	<u>4.3</u>	<u>1.2</u>	<u>1.7</u>	<u>0.8</u>	<u>0.4</u>				<u>8.6</u>	100.0

Source: Page(1981, p. 60) and estimates (underlined).

Remarks:

The US is probably the country with the fewest available data about its invoicing pattern. This poses a problem because the dollar fulfils an important vehicle role in the denomination of international trade. The estimations are mainly based on trading partner data.

For the above estimates, data from Page (1981, p. 60) have been used as a basis. She based her estimates on a limited survey and information about pricing policies for individual primary commodities, see Page, (1981, p. 72). Her data about invoicing in the US have been combined with our recent data on invoicing practices of trading partners. In doing so, we have been able to calculate the use of the major currencies (except the dollar) for denomination of US imports and exports. The boxes describe briefly how the estimates have been calculated. For a further explanation the reader is referred to the examples of explanations in annex I. For example the use of the yen is explained with example 2 on page 63.

Example 1 on page 55 explains how we have estimated the use of the dollar by the US.

However, this problem of having only estimations for such an important country in world trade will be solved when the Bureau of labour Statistics releases data on invoicing practices in the US later this year.

Denomination of US exports, estimations

Denomination of US exports, estimations					
US exports to the Netherlands:					
	% of US X to the Netherlands		% of Dutch M from US in guilders		% of US X in guilders
	source		source		source
1980	3.9% IMF *		8.8% (0.119/0.339)*0.251 =		0.3% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.339=% of Dutch M denominated in Guilder in 1987</i>		<i>0.251=% of Dutch M denominated in Guilder in 1980</i>
1987	3.3% IMF *		11.9% DNB =		0.4% estimation
1992	3.1% IMF *		19.2% DNB =		0.6% estimation
US exports to United Kingdom:					
	% of US X to United Kingdom		% of UK M from US in Sterling		% of US X in Sterling
	source		source		source
1980	5.8% IMF *		17.2% (0.01/0.058) =		1.0% Page
1987	5.6% IMF *		17.0% Nat. Stat. Off. =		0.9% estimation
1992	5.1% IMF *		18.3% (0.17/0.4)*0.43 =		0.9% extrapolation
	<i>Extrapolation from 1987 to 1992 with:</i>		<i>0.40=% of UK M denominated in Sterling in 1987</i>		<i>0.43=% of UK M denominated in Sterling in 1992</i>
US exports to Italy:					
	% of US X to Italy		% of Italian M in lire		% of US X in lire
	source		source		source
1980	2.5% IMF *		8.8% like the Netherlands =		0.2% estimation
1987	2.2% IMF *		11.9% like the Netherlands =		0.3% estimation
1992	1.9% IMF *		19.2% like the Netherlands =		0.4% estimation
US exports to France:					
	% of US X to France		% of French M in French franc		% of US X in Ffranc
	source		source		source
1980	3.4% IMF *		20.4% as Germany =		0.7% estimation
1987	3.1% IMF *		25.0% as Germany =		0.8% estimation
1992	3.3% IMF *		26.5% as Germany =		0.9% estimation
US exports to Germany:					
	% of US X to Germany		% of German M in Dmark		% of US X in Dmark
	source		source		source
1980	4.9% IMF *		20.4% 0.01/0.049 =		1.0% Page
1987	4.7% IMF *		25.0% (0.204/0.43)*0.527 =		1.2% extrapolation
	<i>Extrapolation from 1980 to 1987 with:</i>		<i>0.43=% of German M denominated in Deutschmark in 1980</i>		<i>0.527=% of German M denominated in Deutschmark in 1987</i>
1992	4.8% IMF *		26.5% (0.204/0.43)*0.559 =		1.3% extrapolation
	<i>Extrapolation from 1980 to 1992 with:</i>		<i>0.43=% of German M denominated in Deutschmark in 1980</i>		<i>0.559=% of German M denominated in Deutschmark in 1992</i>
US exports to Japan:					
	% of US X to Japan		% of Japanese M from US in yen		% of US X in yen
	source		source		source
1980	9.4% IMF *		2.1% (0.094/0.106)*0.024 =		0.2% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.106=% of Japanese M denominated in yen in 1987</i>		<i>0.024=% of Japanese M denominated in yen in 1980</i>
1987	9.0% IMF *		9.4% MITI =		0.8% estimation
1992	10.7% IMF *		13.8% MITI =		1.5% estimation

Denomination of US imports, estimations						
US imports from the Netherlands:						
	% of US M from the Netherlands		% of Dutch X to US in guilders		% of US M in guilders	
	source		source		source	
1980	0.8% IMF *		27.3% (0.287/0.457)*0.435 =		0.2% extrapolation	
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.457=% of Dutch X denominated in Guilder in 1987</i>			
			<i>0.435=% of Dutch X denominated in Guilder in 1980</i>			
1987	1.0% IMF *		28.7% DNB =		0.3% estimation	
1992	1.0% IMF *		35.5% DNB =		0.4% estimation	
US imports from the United Kingdom:						
	% of US M from United Kingdom		% of UK X to the US in Sterling		% of US M in Sterling	
	source		source		source	
1980	4.0% IMF *		37.5% +(0.015/0.04) =		1.5% Page	
1987	4.2% IMF *		38.0% Nat. Stat. Off. =		1.6% estimation	
1992	3.7% IMF *		46.0% Nat. Stat. Off. (198 =		1.7% extrapolation	
US imports from Italy:						
	% of US M from Italy		% of Italian X in lire		% of US M in lire	
	source		source		source	
1980	1.8% IMF *		27.3% like the Netherlands =		0.5% estimation	
1987	2.8% IMF *		28.7% like the Netherlands =		0.8% estimation	
1992	2.3% IMF *		35.5% like the Netherlands =		0.8% estimation	
US imports from France:						
	% of US M from France		% of French X in Ffranc		% of US M in Ffranc	
	source		source		source	
1980	2.2% IMF *		46.3% (0.01/0.022) =		1.0% Page	
1987	2.6% IMF *		47.8% (0.463/0.605)*0.624 =		1.3% extrapolation	
	<i>Extrapolation from 1980 to 1987 with:</i>		<i>0.605=% of French X denominated in French franc in 1980</i>			
			<i>0.624=% of French X denominated in French franc in 1987</i>			
1992	2.8% IMF *		41.8% BdFrance =		1.2% extrapolation	
	<i>Extrapolation from 1980 to 1992 with:</i>		<i>0.605=% of French X denominated in French franc in 1980</i>			
			<i>0.546=% of French X denominated in French franc in 1992</i>			
US imports from Germany:						
	% of US M from Germany		% of German X in Dmark		% of US M in Dmark	
	source		source		source	
1980	4.8% IMF *		86.0% (0.041/0.048) =		4.1% Page	
1987	6.6% IMF *		84.9% (0.86/0.825)*0.815 =		5.6% extrapolation	
	<i>Extrapolation from 1980 to 1987 with:</i>		<i>0.825=% of German X denominated in Deutschmark in 1980</i>			
			<i>0.815=% of German X denominated in Deutschmark in 1987</i>			
1992	5.4% IMF *		80.2% (0.86/0.825)*0.77 =		4.3% extrapolation	
	<i>Extrapolation from 1980 to 1992 with:</i>		<i>0.825=% of German X denominated in Deutschmark in 1980</i>			
			<i>0.77=% of German X denominated in Deutschmark in 1992</i>			
US imports from Japan:						
	% of US M from Japan		% of Japanese X to US in yen		% of US M in yen	
	source		source		source	
1980	12.8% IMF *		13.3% (0.153/0.338)*0.294 =		1.7% estimation	
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.338=% of Japanese X denominated in yen in 1987</i>			
			<i>0.294=% of Japanese X denominated in yen in 1980</i>			
1987	20.8% IMF *		15.3% MITI =		3.2% estimation	
1992	18.0% IMF *		16.6% MITI =		3.0% estimation	

6.2. Japan

Currency denomination of Japanese exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	65.7	29.4	1.9	<u>0.6</u>	<u>1.1</u>	<u>0.1</u>	<u>0.6</u>				<u>0.6</u>	100.0
1981		32.2										32.2
1982		31.2										31.2
1983		34.5										34.5
1984		33.7										33.7
1985		35.9										35.9
1986	54.2	35.3									10.5	100.0
1987	54.6	33.8	<u>3.0</u>	<u>0.9</u>	<u>1.5</u>	<u>0.2</u>	<u>0.5</u>				5.5	100.0
1988	53.4	34.1									12.5	100.0
1989	51.6	35.2									13.3	100.1
1990	47.7	38.4									13.9	100.0
1991	48.5	38.1									13.5	100.1
1992	46.6	40.1	<u>3.3</u>	<u>0.9</u>	<u>1.6</u>	<u>0.4</u>	<u>1.0</u>				<u>6.1</u>	100.0

Currency denomination of Japanese imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	93.0	2.4	<u>1.5</u>	<u>0.9</u>	<u>1.0</u>	<u>0.2</u>	<u>0.1</u>				<u>0.9</u>	100.0
1985		7.3										7.3
1986	83.2	9.7	2.9								4.2	100.0
1987	80.5	11.6	3.4	<u>1.2</u>	<u>1.1</u>	<u>0.5</u>	<u>0.3</u>				1.4	100.0
1988	78.1	13.6	3.6								4.8	100.1
1989	77.0	14.0	3.7								5.3	100.0
1990	75.8	14.5	4.0								5.7	100.0
1991	76.2	15.4	3.6								4.8	100.0
1992	74.5	17.0	3.6	<u>1.3</u>	<u>1.3</u>	<u>0.7</u>	<u>0.3</u>				<u>1.3</u>	100.0

Source: Japanese Ministry of International Trade and Industry, Ministry of Finance and estimates (underlined).

Remarks Japan:

Quite good data for Japan are available. The MITI specifies the use of the dollar, the yen and the DM. The other currencies account for about 10%. The uses of other currencies for denomination of Japanese trade have been estimated by using trading partner data.

Estimates for the DM, FF, Lira and pound have been made by using assumption I and III, see example 4 on page 64. The use of the guilder is done like in example 2.

Furthermore, trade data from Japan specify both the origin of the imports and the destination of the exports, see data Japan on page 80. This gives us insight in the use of the yen and the dollar for denomination of trade between Japan and: the United States, the European Union and South East Asia. These data have been used for the estimations on the use of the yen in Europe, the US and Asia. See for example the use of the yen for denomination of Italian exports, Section 6.6, page 89.

Denomination of Japanese exports, estimations.					
Japanese exports to the Netherlands:					
	% of Japanese X to the Netherlands		% of Dutch M from Japan in guilders		% of Japanese X in guilders
	source		source		source
1980	2.9% IMF *		21.0% (0.283/0.339)*0.251	=	0.6% estimation
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.339 = % of Dutch M denominated in Guilder in 1987</i>		
			<i>0.251 = % of Dutch M denominated in Guilder in 1980</i>		
1987	1.8% IMF *		28.3% DNB	=	0.5% estimation
1992	2.4% IMF *		41.5% DNB	=	1.0% estimation
Japanese exports to United Kingdom:					
	% of Japanese X to United Kingdom		% of UK M in Sterling		% of Japanese X in Sterling
	source		source		source
1980	2.9% IMF *		38.0% Nat. Stat. Off.	=	1.1% estimation
1987	3.7% IMF *		40.0% Nat. Stat. Off.	=	1.5% estimation
1992	3.6% IMF *		43.0% Nat. Stat. Off.	=	1.6% estimation
Japanese exports to Italy:					
	% of Japanese X to Italy		% of Italian M in lire		% of Japanese X in lire
	source		source		source
1980	0.7% IMF *		18.0% Bd'Italia	=	0.1% estimation
1987	0.9% IMF *		27.0% Bd'Italia	=	0.2% estimation
1992	1.2% IMF *		34.0% Bd'Italia	=	0.4% estimation
Japanese exports to France:					
	% of Japanese X to France		% of French M in Ffranc		% of Japanese X in Ffranc
	source		source		source
1980	1.6% IMF *		37.1% BdFrance	=	0.6% estimation
1987	1.8% IMF *		48.6% BdFrance	=	0.9% estimation
1992	1.9% IMF *		46.7% BdFrance	=	0.9% estimation
Japanese exports to Germany:					
	% of Japanese X to Germany		% of German M in Dmark		% of Japanese X in Dmark
	source		source		source
1980	4.4% IMF *		43.0% BUBA	=	1.9% estimation
1987	5.6% IMF *		52.7% BUBA	=	3.0% estimation
1992	6.0% IMF *		55.9% BUBA	=	3.3% estimation

Invoicing of Japanese exports, by destination of exports, in %

	1987	1988	1989	1990	1991	1992	1993
To the European Union							
yen	44.6	43.5	41.6	42.3	41.4	40.3	42.7
dollar	7.8	7.4	6.9	6.3	7.9	11.1	7.2
other	47.6	49.1	51.6	51.4	50.7	48.4	50.1
To the United States							
yen	15.3	16.3	16.6	16.5	17.9	16.6	18.0
dollar	84.7	83.7	83.3	83.5	82.0	83.2	81.6
other	0.1	0.1	0.1	0.1	0.1	0.1	0.3
To South East Asia							
yen	41.1	41.5	44.6	49.8	50.8	52.3	52.4
dollar	56.5	55.7	52.4	47.2	46.0	41.6	44.4
other	2.5	2.8	3.0	3.0	3.2	5.9	3.2

Invoicing of Japanese imports, by origin of imports, in %

	1986	1987	1988	1989	1990	1991	1992	1993
From the European Union								
yen	28.9	27.1	27.4	27.1	27.8	30.2	31.7	35.7
dollar	21.2	20.0	21.0	18.8	16.1	17.2	17.9	24.2
Dmark	27.9	30.2	29.2	29.3	29.9	29.6	28.9	23.4
other	22.0	22.7	22.4	24.8	26.2	23.0	21.5	16.7
From the United States								
yen	7.8	9.4	10.2	10.2	11.4	10.4	13.8	16.2
dollar	91.9	90.5	89.6	89.6	88.4	89.5	86.0	83.6
Dmark	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
other	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1
From South East Asia								
yen	9.2	13.9	18.1	19.5	19.6	22.6	23.8	23.4
dollar	89.8	85.0	80.6	78.8	78.6	75.4	73.9	74.8
Dmark	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
other	0.9	1.0	1.2	1.6	1.7	1.9	2.2	1.7

Source: Japanese Ministry of International Trade and Industry.

6.3. Germany

Remarks Germany:

The Deutsche Bundesbank provided a rather complete currency breakdown of the German invoicing pattern. Only one estimate had to be made. After 1989 the Deutsche Bundesbank did not specify the guilder anymore.

Currency denomination of German exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1972	6.5		84.0	2.5	1.2	1.2	1.2	0.8	1.0		1.6	100.0
1975	4.4		89.2	1.7	0.9	0.7	0.9	0.5	0.4		1.3	100.0
1980	7.2		82.5	2.8	1.4	1.3	1.2	0.9	0.5		2.2	100.0
1981	7.8		82.2	2.8	1.3				0.5		5.6	100.0
1982	7.8		82.2	2.8	1.3				0.5		5.6	100.0
1983	7.0		82.6	2.8	1.5				0.5		5.8	100.0
1984	9.7	0.3	79.4	2.8	1.7				0.5		5.7	100.0
1985	9.5	0.4	79.5	2.7	1.8	1.5	1.0	0.9	0.5		2.2	100.0
1986	7.7	0.4	81.5	2.7	1.7	1.5	0.9	0.7	0.5		2.4	100.0
1987	7.4	0.5	81.5	2.5	1.8	1.7	0.9	0.7	0.6		2.4	100.0
1988	8.1	0.4	79.2	3.3	2.1	1.8	1.0	1.0	0.6		2.5	100.0
1989	7.6	0.4	79.3	3.4	2.6	1.9	0.9	0.9	0.5		2.5	100.0
1990	6.5	0.4	77.0	4.0	2.7	2.2				0.4	6.8	100.0
1991	7.8	0.4	77.2	3.3	2.5	2.1				0.3	6.4	100.0
1992	7.3	0.3	77.0	3.3	3.2	2.2	<u>0.9</u>			0.4	<u>5.4</u>	100.0

Currency denomination of German imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1972	18.6		49.9	4.3	4.9	7.5	3.3	2.2	1.9		7.4	100.0
1975	30.9		42.5	4.2	3.6	2.7	2.6	1.8	1.7		10.0	100.0
1980	32.3		43.0	3.3	3.4	2.4	2.0	1.6	1.6		10.4	100.0
1981	32.3		43.0	3.0	3.7				1.6		16.4	100.0
1982	31.3		44.6	3.4	2.5				1.6		16.6	100.0
1983	28.8		46.1	3.5	2.7				1.5		17.4	100.0
1984	29.2		47.0	3.6	2.4				1.5		16.5	100.0
1985	28.1	1.8	47.8	3.8	3.0	1.5	1.4	0.9	1.5		10.2	100.0
1986	23.1	2.6	51.7	4.1	2.3	1.5	1.5	0.8	1.7		10.8	100.0
1987	22.0	2.5	52.7	3.9	2.5	1.6	1.4	0.9	1.8		10.9	100.0
1988	21.6	2.5	52.6	3.6	2.4	1.6	1.5	0.8	1.7	0.1	11.8	100.0
1989	22.5	2.0	52.8	4.0	2.6	1.8	1.4	0.7	1.7	0.1	10.5	100.0
1990	20.9	1.8	54.3	3.6	2.5	1.9	1.4	0.8	1.8	0.1	11.0	100.0
1991	20.5	2.0	55.4	3.0	2.3	1.8	1.3	0.7	1.6	0.2	11.3	100.0
1992	18.4	1.7	55.9	3.1	2.2	1.7	1.3	0.7	1.6	0.2	13.5	100.0

Source: Deutsche Bundesbank and estimates (underlined).

Denomination of German imports, estimation

German exports to the Netherlands:

% of German X to the Netherlands			% of Dutch M from Germany in guilder			% of German X in guilders		
	source		source		source			
1989	8.5% IMF	*	10.6% (0.09/0.085)	=	0.9% BUBA			
1992	8.3% IMF	*	12.2% (0.106/0.338)*0.389	=	1.0% estimation			
<i>Extrapolation from 1989 to 1992 with:</i>			<i>0.338=% of Dutch M denominated in Dutch guilders in 1989</i>					
			<i>0.389=% of Dutch M denominated in Dutch guilders in 1992</i>					

6.4. France

Remarks France:

The Banque de France provided good data. Some extrapolations have been to calculate the use of minor currencies in 1980. The collection of data on minor currencies started in 1988. The data of the year 1988 have been used to make estimations for the yen, the pound, the lira and the guilder in the year 1980.

Currency denomination of French exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1981	20.3	<u>0.1</u>	9.1	60.5	<u>2.1</u>	<u>1.5</u>	<u>0.8</u>				<u>5.6</u>	100.0
1982	19.7		8.3	62.7							<u>9.3</u>	100.0
1983	18.7		8.3	64.4							<u>8.6</u>	100.0
1984	21.8		8.4	60.9							<u>8.9</u>	100.0
1985	21.0		8.4	59.7						0.2	<u>10.7</u>	100.0
1986	15.1		8.8	64.2						0.4	<u>11.5</u>	100.0
1987	14.8		9.5	62.4						0.6	<u>12.7</u>	100.0
1988	16.0	0.7	8.9	58.2	3.3	2.6	1.4	2.0	1.3	0.3	<u>5.3</u>	100.0
1989	17.5	0.7	9.4	57.2	3.8	3.1	1.5	2.1	1.5	0.4	<u>2.8</u>	100.0
1990	15.5	0.8	9.9	57.4	4.0	3.2	1.4	2.2	1.4	0.5	<u>3.7</u>	100.0
1991	16.2	0.8	10.9	54.6	4.3	3.4	1.5	2.2	1.3	0.6	<u>4.2</u>	100.0
1992	16.5	0.8	10.4	54.6	4.1	3.3	1.5		1.1	0.7	<u>7.0</u>	100.0

Currency denomination of French imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1981	37.1	<u>0.7</u>	11.5	37.1	<u>2.6</u>	<u>2.5</u>	<u>1.8</u>				<u>6.7</u>	100.0
1982	34.9		10.8	40.8							<u>13.5</u>	100.0
1983	30.7		10.2	46.1							<u>13.0</u>	100.0
1984	33.0		9.9	44.5							<u>12.6</u>	100.0
1985	27.8		10.3	46.2						0.6	<u>15.1</u>	100.0
1986	18.2		12.0	52.2						1.0	<u>16.6</u>	100.0
1987	20.7		12.9	48.6						1.0	<u>16.9</u>	100.0
1988	21.7	1.5	12.7	48.2	2.8	3.4	1.7	2.6	1.5	0.4	<u>3.5</u>	100.0
1989	23.5	1.4	11.5	47.9	3.0	3.3	1.5	2.5	1.4	0.6	<u>3.4</u>	100.0
1990	22.2	1.2	11.8	47.9	3.3	3.4	1.5	2.5	1.4	0.7	<u>4.1</u>	100.0
1991	23.4	1.4	11.5	46.2	3.5	3.5	1.5	2.4	1.4	0.7	<u>4.5</u>	100.0
1992	23.1	1.3	11.7	46.7	3.6	3.2	1.5		1.3	0.8	<u>6.8</u>	100.0

Source: Banque de France and estimates (underlined).

Denomination of French exports, estimations

Denomination of French Exports, Estimations						
French exports to the Netherlands:						
	% of French X to the Netherlands		% of Dutch M from France in guilders		% of French X in guilders	
	source		source		source	
1981	4.2% IMF *		19.4% (0.261/0.337)*0.251 =		0.8% estimation	
1988	5.4% IMF *		26.1% (0.014/0.054) =		1.4% BdFrance	
	<i>Extrapolation from 1988 to 1981 with:</i>		<i>0.337=% of Dutch M denominated in Dutch guilders in 1988</i>			
			<i>0.251=% of Dutch M denominated in Dutch guilders in 1980</i>			
French exports to United Kingdom:						
	% of French X to United Kingdom		% of UK M from France in Sterling		% of French X in Sterling	
	source		source		source	
1981	6.8% IMF *		31.1% (0.352/0.43)*0.38 =		2.1% estimation	
1988	9.4% IMF *		35.2% (0.033/0.094) =		3.3% BdFrance	
	<i>Extrapolation from 1988 to 1981 with:</i>		<i>0.43=% of UK M denominated in Sterling in 1988</i>			
			<i>0.38=% of UK M denominated in Sterling in 1981</i>			
French exports to Italy:						
	% of French X to Italy		% of Italian M from France in lire		% of French X in lire	
	source		source		source	
1981	10.9% IMF *		13.5% (0.222/0.28)*0.17 =		1.5% estimation	
1988	11.7% IMF *		22.2% (0.026/0.117) =		2.6% BdFrance	
	<i>Extrapolation from 1988 to 1981 with:</i>		<i>0.28=% of Italian M denominated in Lire in 1988</i>			
			<i>0.17=% of Italian M denominated in Lire in 1981</i>			
French exports to Japan:						
	% of French X to Japan		% of Japanese M from France in yen		% of French X in yen	
	source		source		source	
1981	1.0% IMF *		7.5% (0.427/0.136)*0.024 =		0.1% estimation	
1988	1.6% IMF *		42.7% (0.007/0.016) =		0.7% BdFrance	
	<i>Extrapolation from 1988 to 1981 with:</i>		<i>0.136=% of Japanese M denominated in yen in 1988</i>			
			<i>0.024=% of Japanese M denominated in yen in 1980</i>			

Denomination of French imports, estimations

Denomination of French imports estimations					
French imports from the Netherlands:					
% of French M to the Netherlands			% of Dutch X to France in guilders		% of French M in guilders
	source		source		source
1981	5.8% IMF *		31.6% (0.327/0.45)*0.435 =		1.8% estimation
1988	5.2% IMF *		32.7% (0.017/0.052) =		1.7% BdFrance
<i>Extrapolation from 1988 to 1981 with:</i>			<i>0.45=% of Dutch X denominated in Dutch guilders in 1988</i>		
			<i>0.435=% of Dutch X denominated in Dutch guilders in 1980</i>		
French imports from the United Kingdom:					
% of French M from United Kingdom			% of UK X to France in Sterling		% of French M in Sterling
	source		source		source
1981	5.4% IMF *		47.6% (0.391/0.625)*0.76 =		2.6% estimation
1988	7.2% IMF *		39.1% (0.028/0.072) =		2.8% BdFrance
<i>Extrapolation from 1988 to 1981 with:</i>			<i>0.625=% of UK X denominated in Sterling in 1988</i>		
			<i>0.76=% of UK X denominated in Sterling in 1981</i>		
French imports from Italy:					
% of French M from Italy			% of Italian X to France in lire		% of French M in Lire
	source		source		source
1981	8.9% IMF *		27.5% (0.298/0.39)*0.36 =		2.5% estimation
1988	11.4% IMF *		29.8% (0.034/0.114) =		3.4% BdFrance
<i>Extrapolation from 1988 to 1981 with:</i>			<i>0.39=% of Italian X denominated in Lire in 1988</i>		
			<i>0.36=% of Italian X denominated in Lire in 1981</i>		
French imports from Japan:					
% of French M from Japan			% of Japanese X to France in yen		% of French M in yen
	source		source		source
1981	2.3% IMF *		31.6% (0.366/0.341)*0.294 =		0.7% estimation
1988	4.1% IMF *		36.6% (0.015/0.041) =		1.5% BdFrance
<i>Extrapolation from 1988 to 1981 with:</i>			<i>0.341% of Japanese X denominated in yen in 1988</i>		
			<i>0.294% of Japanese X denominated in yen in 1980</i>		

6.5. United Kingdom

Remarks United Kingdom:

In the UK the Central Statistical Office (CSO) undertakes from time to time a survey. One survey was held in 1980 and the last one was held in November 1988. Data are specified in dollar and pound sterling and the DM in 1988. Data come from the CSO but the one for the year 1980 have been found in the article of Page (1981).

The invoicing pattern is divided by the origin and destination of imports and exports

Considering that sterling was rather often used for denomination of exports (in 1980 76% of exports was invoiced in sterling), estimates have been calculated of the use of the import currency, see example 6 on page 65. The data from Japan have been used to estimate the use of the yen in UK exports (example 2 on page 63). The data for the FF for 1980 have been extrapolated to 1988 and 1992 (example 3 on page 63). See Annex I for more explanation of the estimates.

Currency denomination of British exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	17.0	0.1	3.0	2.0	76.0	<u>0.5</u>	<u>1.0</u>				<u>0.4</u>	100.0
1986	28.0				55.5						<u>16.5</u>	100.0
1987	26.0	<u>0.5</u>	4.0	<u>3.4</u>	57.0	<u>1.3</u>	<u>1.8</u>				<u>6.0</u>	100.0
1988	21.5				62.5						<u>16.0</u>	100.0
1992	<u>22.0</u>	<u>0.7</u>	<u>5.0</u>	<u>3.5</u>	62.0	<u>1.7</u>	<u>2.3</u>				<u>2.8</u>	100.0

Currency denomination of British imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	29.0	<u>1.3</u>	<u>9.6</u>	<u>4.7</u>	38.0	<u>1.7</u>	<u>2.8</u>				<u>12.9</u>	100.0
1986	24.0				38.5						<u>37.5</u>	100.0
1987	24.0	<u>2.6</u>	14.0	<u>5.5</u>	40.0	<u>2.1</u>	<u>3.2</u>				<u>8.6</u>	100.0
1988	22.5				43.0						<u>34.5</u>	100.0
1992	<u>22.0</u>	<u>2.4</u>	<u>11.9</u>	<u>5.3</u>	43.0	<u>2.2</u>	<u>3.2</u>				<u>10.0</u>	100.0

Source: Business Bulletin (December 1989, p. 7, p. 4) from the Central Statistical Office, Page (1981, p. 60), and estimates (underlined).

Denomination of UK exports, estimations

Denomination of UK exports, estimations						
UK exports to the Netherlands:						
	% of UK X to the Netherlands			% of Dutch M in guilders		% of UK X in guilders
		source			source	
1980	8.1%	IMF	*	12.0%	estimate	= 1.0% estimation
1987	7.3%	IMF	*	25.0%	estimate	= 1.8% estimation
1992	7.8%	IMF	*	30.0%	estimate	= 2.3% estimation
UK exports to Italy:						
	% of UK X to Italy			% of Italian M in lire		% of UK X in lire
		source			source	
1980	5.2%	IMF	*	10.0%	estimate	= 0.5% estimation
1987	5.2%	IMF	*	25.0%	estimate	= 1.3% estimation
1992	5.7%	IMF	*	30.0%	estimate	= 1.7% estimation
UK exports to France:						
	% of UK X to France			% of Italian M in lire		% of UK X in Ffranc
		source			source	
1980	7.6%	IMF	*	26.4%	(0.02/0.076)	= 2.0% Page
1987	9.8%	IMF	*	34.6%	(0.264/0.371)*0.486	= 3.4% extrapolation
	<i>Extrapolation from 1980 to 1987 with:</i>			<i>0.486 = % of French M denominated in French franc in 1987</i>		
				<i>0.371 = % of French M denominated in French franc in 1980</i>		
1992	10.6%	IMF	*	33.2%	(0.264/0.371)*0.467	= 3.5% extrapolation
	<i>Extrapolation from 1980 to 1992 with:</i>			<i>0.467 = % of French M denominated in French franc in 1992</i>		
				<i>0.371 = % of French M denominated in French franc in 1980</i>		
UK exports to Germany:						
	% of UK X to Germany			% of German M in Dmark		% of UK X in Dmark
		source			source	
1980	10.7%	IMF	*	28.0%	(0.107/0.03)	= 3.0% Page
1987	11.8%	IMF	*	34.0%	(0.04/0.118)	= 4.0% Nat. Stat. Off.
1992	13.9%	IMF	*	36.1%	(0.34/0.527)*0.559	= 5.0% extrapolation
	<i>Extrapolation from 1987 to 1992 with:</i>			<i>0.527 = % of German M denominated in Deutschmark in 1987</i>		
				<i>0.559 = % of German M denominated in Deutschmark in 1992</i>		
UK exports to Japan:						
	% of UK X to Japan			% of Japanese M in yen		% of UK X in yen
		source			source	
1980	1.3%	IMF	*	5.6%	(0.271/0.116)*0.024	= 0.1% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>			<i>0.116 = % of Japanese M denominated in yen in 1987</i>		
				<i>0.024 = % of Japanese M denominated in yen in 1980</i>		
1987	1.9%	IMF	*	27.1%	MITI	= 0.5% estimation
1992	2.1%	IMF	*	31.7%	MITI	= 0.7% estimation

Denomination of UK imports, estimations

Denomination of UK imports, estimations					
UK imports from the Netherlands:					
	% of UK M from the Netherlands		% Dutch X to the EU in guilders		% of UK M in guilders
	source		source		source
1980	6.8% IMF *		40.6% (0.427/0.457)*0.435 =		2.8% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.457=% of Dutch X denominated in Guilder in 1987</i>		
			<i>0.435=% of Dutch X denominated in Guilder in 1980</i>		
1987	7.6% IMF *		42.7% DNB =		3.2% estimation
1992	7.9% IMF *		41.1% DNB =		3.2% estimation
UK imports from Italy:					
	% of UK M from Italy		% of Italian X in lire		% of UK M in lire
	source		source		source
1980	4.6% IMF *		36.0% Bd'Italia =		1.7% estimation
1987	5.6% IMF *		38.0% Bd'Italia =		2.1% estimation
1992	5.4% IMF *		40.0% Bd'Italia =		2.2% estimation
UK imports from France:					
	% of UK M from France		% of French X in Ffranc		% of UK M in Ffranc
	source		source		source
1980	7.8% IMF *		60.5% BdFrance =		4.7% estimation
1987	8.9% IMF *		62.4% BdFrance =		5.5% estimation
1992	9.7% IMF *		54.6% BdFrance =		5.3% estimation
UK imports from Germany:					
	% of UK M from Germany		% of German X in Dmark		% of UK M in Dmark
	source		source		source
1980	11.4% IMF *		84.3% (0.833/0.815)*0.825 =		9.6% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.815=% of German X denominated in Deutschmark in 1987</i>		
			<i>0.825=% of German X denominated in Deutschmark in 1980</i>		
1987	16.8% IMF *		83.3% (0.14/0.169) =		14.0% Nat. Stat. Off.
1992	15.1% IMF *		78.7% (0.833/0.815)*0.77 =		11.9% extrapolation
	<i>Extrapolation from 1987 to 1992 with:</i>		<i>0.815=% of German X denominated in Deutschmark in 1987</i>		
			<i>0.77=% of German X denominated in Deutschmark in 1992</i>		
UK imports from Japan:					
	% of UK M from Japan		% of Japanese in yen		% of UK M in yen
	source		source		source
1980	3.4% IMF *		38.8% (0.446/0.338)*0.294 =		1.3% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.338=% of Japanese X denominated in yen in 1987</i>		
			<i>0.294=% of Japanese X denominated in yen in 1980</i>		
1987	5.8% IMF *		44.6% MITI =		2.6% estimation
1992	5.9% IMF *		40.8% MITI =		2.4% estimation

6.6. Italy

Remarks Italy:

Data from Banca d'Italia are specified for the Italian lira, the dollar, the DM, and the FF. This means that estimates had to be made for the guilder, the yen and pound sterling. We have used the trading partner data for the estimations. Assumption: the average use of the currency is used as an estimate for the use in trade with Italy (assumption III).

Currency denomination of Italian exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	30.0	<u>0.1</u>	14.0	8.0	<u>2.4</u>	36.0	<u>1.0</u>				8.5	100.0
1981	37.0		13.0	8.0		31.0					11.0	100.0
1982	36.0		14.0	9.0		31.0					10.0	100.0
1983	34.0		15.0	8.0		32.0					11.0	100.0
1984	35.0		14.0	8.0		32.0					11.0	100.0
1985	32.0		15.0	8.0		33.0					12.0	100.0
1986	23.0		17.0	9.0		37.0					14.0	100.0
1987	20.0	<u>0.4</u>	18.0	9.0	<u>3.1</u>	38.0	<u>1.1</u>				10.4	100.0
1988	19.0		17.0	10.0		39.0					15.0	100.0
1989	19.0		17.0	10.0		39.0					15.0	100.0
1990	17.0		18.0	10.0		41.0					14.0	100.0
1991	17.0		19.0	10.0		40.0					14.0	100.0
1992	18.0	<u>0.6</u>	19.0	9.0	<u>3.0</u>	40.0	<u>1.3</u>				9.1	100.0

Currency denomination of Italian imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	45.0	<u>0.5</u>	14.0	9.0	<u>3.2</u>	18.0	<u>1.7</u>				8.6	100.0
1981	47.0		14.0	8.0		17.0					14.0	100.0
1982	45.0		15.0	8.0		19.0					13.0	100.0
1983	43.0		14.0	8.0		20.0					15.0	100.0
1984	43.0		14.0	8.0		21.0					14.0	100.0
1985	40.0		16.0	8.0		22.0					14.0	100.0
1986	29.0		18.0	10.0		26.0					17.0	100.0
1987	28.0	<u>0.9</u>	19.0	9.0	<u>2.9</u>	27.0	<u>2.4</u>				10.8	100.0
1988	27.0		20.0	9.0		28.0					16.0	100.0
1989	28.0		20.0	8.0		29.0					15.0	100.0
1990	26.0		18.0	8.0		32.0					16.0	100.0
1991	27.0		17.0	7.0		32.0					17.0	100.0
1992	26.0	<u>0.9</u>	16.0	7.0	<u>3.5</u>	34.0	<u>2.4</u>				10.2	100.0

Source: Banca d'Italia.

Denomination of Italian exports, estimations.					
Italian exports to the Netherlands:					
	% of Italian X to the Netherlands		% of Dutch M from the EU in guilders		% of Italian X in guilders
	source		source		source
1980	3.7% IMF *		26.6% (0.359/0.339)*0.251	=	1.0% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		0.339=% of Dutch M denominated in Dutch guilders in 1987		
			0.251=% of Dutch M denominated in Dutch guilders in 1980		
1987	3.1% IMF *		35.9% DNB	=	1.1% estimation
1992	3.1% IMF *		40.8% DNB	=	1.3% estimation
Italian exports to United Kingdom:					
	% of Italian X to United Kingdom		% of UK M from the EU in Sterling		% of Italian X in Sterling
	source		source		source
1980	6.1% IMF *		39.9% (0.42/0.4)*0.38	=	2.4% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		0.40=% of UK M denominated in Sterling in 1987		
			0.38=% of UK M denominated in Sterling in 1980		
1987	7.4% IMF *		42.0% N. S. Office	=	3.1% estimation
1992	6.5% IMF *		46.5% N. S. Office	=	3.0% estimation
Italian exports to Japan:					
	% of Italian X to Japan		% of Japanese M from the EU in yen		% of Italian X in yen
	source		source		source
1980	0.9% IMF *		6.1% (0.271/0.106)*0.024	=	0.1% extrapolation
	<i>Extrapolation from 1987 to 1980 with:</i>		0.106=% of Japanese M denominated in yen in 1987		
			0.024=% of Japanese M denominated in yen in 1980		
1987	1.6% IMF *		27.1% MITI	=	0.4% estimation
1992	1.8% IMF *		31.7% MITI	=	0.6% estimation

Denomination of Italian imports, estimations.						
Italian imports from the Netherlands:						
	% of Italian M from the Netherlands source		% of Dutch X to the EU in guilders source		% of Italian M in guilders source	
1980	4.2% IMF *		40.6% (0.427/0.457)*0.435	=	1.7% extrapolation	
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.457=% of Dutch X denominated in Dutch guilders in 1987</i>			
			<i>0.435=% of Dutch X denominated in Dutch guilders in 1980</i>			
1987	5.6% IMF *		42.7% DNB	=	2.4% estimation	
1992	5.8% IMF *		41.1% DNB	=	2.4% estimation	
Italian imports from the United Kingdom:						
	% of Italian M from United Kingdom source		% of UK X to the EU in Sterling source		% of Italian M in Sterling source	
1980	4.4% IMF *		73.3% (0.55/0.57)*0.76	=	3.2% extrapolation	
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.57=% of UK X denominated in Sterling in 1987</i>			
			<i>0.76=% of UK X denominated in Sterling in 1980</i>			
1987	5.3% IMF *		55.0% N. S. Office	=	2.9% estimation	
1992	5.6% IMF *		62.0% N. S. Office	=	3.5% estimation	
Italian imports from Japan:						
	% of Italian M from Japan source		% of Japanese X to the EU in yen source		% of Italian M in yen source	
1980	1.3% IMF *		38.8% (0.446/0.338)*0.294	=	0.5% extrapolation	
	<i>Extrapolation from 1987 to 1980 with:</i>		<i>0.338=% of Japanese X denominated in yen in 1987</i>			
			<i>0.294=% of Japanese X denominated in yen in 1980</i>			
1987	2.1% IMF *		44.6% MITI	=	0.9% estimation	
1992	2.3% IMF *		40.8% MITI	=	0.9% estimation	

6.7. The Netherlands

Remarks The Netherlands:

De Nederlandsche Bank (DNB) provided data about the invoicing pattern of the Netherlands. Estimations have been made for the use of the Italian lira and the yen in the year 1980. These estimations have been made by extrapolating the data from the year 1987 to the year 1980. Furthermore DNB specified for the origin and destination of the imports and exports. This specification has given a good insight in the use of the guilder and other currencies per trade flow.

Currency denomination of Dutch exports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	16.5		21.5	5.4	4.2	0.9	43.5				8.0	100.0
1987	16.9	0.3	18.6	4.8	5.3	1.5	45.7	3.6	0.6	0.5	2.2	100.0
1988	17.2	0.4	18.5	4.7	6.1	1.5	45.0	3.3	0.7	0.6	2.0	100.0
1989	17.7	0.4	18.0	4.9	5.7	1.4	44.1	3.6	0.6	1.0	2.6	100.0
1990	16.9	0.4	19.6	5.0	5.5	1.8	43.3	3.7	0.7	0.8	2.3	100.0
1991	17.0	0.5	21.4	4.7	4.8	1.6	42.6	3.5	0.6	0.8	2.5	100.0
1992	16.0	0.5	21.7	4.8	4.8	1.8	43.1	3.6	0.5	0.7	2.5	100.0

Currency denomination of Dutch imports, in %

	dollar	yen	Dmark	Ffranc	pound	lira	guilder	Bfranc	SWfranc	PrivECU	other	total
1980	29.4	0.8	22.9	4.4	4.7	1.1	25.1				11.6	100.0
1987	23.9	1.6	23.5	4.1	4.0	1.4	33.9	3.6	1.0		3.0	100.0
1988	23.0	1.9	24.2	4.2	4.2	1.3	33.7	3.6	1.0	0.1	2.8	100.0
1989	24.3	1.5	23.2	4.0	3.8	1.2	33.8	3.7	0.8	0.6	3.1	100.0
1990	22.8	1.4	22.4	3.9	3.9	1.3	36.2	3.5	0.9	0.8	2.9	100.0
1991	22.8	1.8	21.9	3.5	4.2	1.3	36.7	3.3	0.9	0.8	2.8	100.0
1992	21.4	2.0	21.8	3.7	3.9	1.1	38.9	3.3	0.8	0.3	2.8	100.0

Source: 1980: Page (1981, p. 60), other: De Nederlandsche Bank.

Denomination of Dutch exports, estimations

Denomination of Dutch exports estimations					
Dutch exports to Italy:					
	% of Dutch X to Italy			% of Italian M from the Netherlands in % of Dutch X in lire	
		source		source	source
1980	5.8%	IMF	*	15.5% (0.232/0.27)*0.18	= 0.9% estimation
1987	6.5%	IMF	*	23.2% (0.015/0.065)	= 1.5% DNB
	<i>Extrapolation from 1987 to 1980 with:</i>			<i>0.27=% of Italian M denominated in Italian lire in 1987</i>	
				<i>0.18=% of Italian M denominated in Italian lire in 1980</i>	
Dutch exports to Japan:					
	% of Dutch X to Japan			% of Japanese M from the Netherlands % of Dutch X in yen	
		source		source	source
1980	0.5%	IMF	*	7.9% (0.383/0.116)*0.024	= 0.0% estimation
1987	0.8%	IMF	*	38.3% (0.003/0.008)	= 0.3% DNB
	<i>Extrapolation from 1987 to 1980 with:</i>			<i>0.116=% of Japanese M denominated in yen in 1987</i>	
				<i>0.024=% of Japanese M denominated in yen in 1980</i>	

Denomination of Dutch imports, estimations

Denomination of Dutch imports estimations					
Dutch imports from Italy:					
	% of Dutch M from Italy			% of Italian X to the Netherlands in lir	% of Dutch M in lire
		source		source	source
1980	3.1%	IMF	*	35.4% (0.373/0.39)*0.36	= 1.1% estimation
1987	3.8%	IMF	*	37.3% (0.014/0.038)	= 1.4% DNB
	<i>Extrapolation from 1987 to 1980 with:</i>			<i>0.39=% of Italian X denominated in Italian lire in 1987</i>	
				<i>0.36=% of Italian X denominated in Italian lire in 1980</i>	
Dutch imports from Japan:					
	% of Dutch M from Japan			% of Japanese X to the Netherlands in % of Dutch M in yen	
		source		source	source
1980	1.9%	IMF	*	41.9% (0.481/0.338)*0.294	= 0.8% estimation
1987	3.3%	IMF	*	48.1% (0.016/0.033)	= 1.6% DNB
	<i>Extrapolation from 1987 to 1980 with:</i>			<i>0.338=% of Japanese X denominated in yen in 1987</i>	
				<i>0.294=% of Japanese X denominated in yen in 1980</i>	

6.8. Estimates of the use of the yen in ROW

Remarks to the use of the yen in ROW:

In the assumptions described in annex I, we have assumed no vehicle role for the yen but only for the dollar. In the assumptions about invoicing behaviour in the ROW, we have assumed that invoicing in Asia behaves half like US and half like Japan. However, this does not apply for the use of the yen because the yen is the national currency of Japan and not used as a vehicle. Thus we have estimated the share of invoicing in yen in these regions with the data we have received from the MITI.

The use of the yen in Asia

We have assumed that the use of the yen in Asian countries is similar to the use of the yen in south east Asia and that the yen does not fulfil a vehicle role (see example 2).

The use of the yen in Can New Z and Australian

The use of the yen in Canada, New Zealand and Australia is assumed to equal to the average use of the yen for denomination Japanese trade, assumption I and III, example 4, page 64.

Denomination of Asian exports to Japan, estimations

Denomination of Asian exports to Japan, estimations					
Asian exports to Japan:					
	% of Asian X to the Japan		% of Japanese M from SE Asian in yen		% of Asian X in yen
	source		source		source
1980	25.4% IMF	*	2.9% (0.139/0.116)*0.024	=	0.7% extrapolation
	Extrapolation from 1987 to 1980 with:		0.116=% of Japanese M denominated in yen in 1987		
			0.024=% of Japanese M denominated in yen in 1980		
1987	15.9% IMF	*	13.9% MITI	=	2.2% estimation
1992	13.2% IMF	*	23.8% MITI	=	3.1% estimation

Denomination of Can, New Z and Australian exports to Japan, estimations

Denomination of Can, New Z and Australian exports to Japan, estimations					
C, NZ and AUS exports to Japan:					
	% of C, NZ and AUS X to Japan		% of Japanese M in yen		% of Asian X in yen
	source		source		source
1980	10.8% IMF	*	2.4% MITI	=	0.3% estimation
1987	10.1% IMF	*	11.6% MITI	=	1.2% estimation
1992	9.9% IMF	*	17.0% MITI	=	1.7% estimation

6.9. Aggregation of country data

The next *Lotus* worksheets illustrate;

- 1) How the invoicing patterns of individual countries have been aggregated, *Worksheet Calculations*, and;
- 2) How the estimations of the currency denomination of international trade in the six regions of the ROW have been made, *Worksheet Formulas*.

6.9.1. Explanation worksheet calculations

Page 0 presents the whole worksheet; pages 1 to 3 are an enlargement of the whole sheet in three pages.

The first worksheet "Calculations" shows that a 96% share of US exports denominated in US dollar in 1980 (E-3), corresponds with a share of world exports denominated in dollar of 11.24% (N-3) by multiplying the share of the US in world exports (11.71%, see B-3) with 96%. Similarly, a share of 40.1% of yen denominated exports of Japan in 1992 (F-64) corresponds with a 3.7% of world exports denominated in Japanese yen (E-64) obtained by multiplying 40.1% with the 9.22% (B-64), the share of Japanese exports in world exports.

The sum of dollar denominated world exports from the Group I; (US, Japan, the five biggest European exporters and OPEC) account to 35.98% (N-11) in 1980, and to 24.71% (N-71) in 1992.

Group I accounted for 64.86% (B-11) of total world exports in 1980. In 1992 they accounted for 58.35% (B-71) of total world exports.

In 1980, the share of the US in world trade (C1) is calculated by;

$$\text{US share in world trade} = \frac{\text{US exports} + \text{US imports}}{\text{World exports} + \text{World imports}}$$

The estimated share of the dollar in world exports is 56.13% in 1980 (N-21). When we divide 56,13% by the share of the US in world trade (12.47%) we obtain 4.5. The dollar is used 4.5 times more than its size in world trade accounts for. In 1992 this factor was 3.6. (N-82).

The data calculated in this worksheet are presented in different tables.

Part E-3 to L-9 and E-63 to L-69 of the worksheet "calculations" are presented in Table 2, Page 13. The data presented in Table 5, Page 16, can be find in column B. The data presented in Table 6, Page 17, can be find in column E-14 to L-20. Table 7 and 8 presents data from the worksheet calculations, column N to U, in a different way.

	A	B	C
1		exports	trade
2	1990, % of world;	in %	in %
3	USA	11.71%	12.47%
4	Japan	6.92%	7.09%
5	Germany	10.23%	9.94%
6	France	6.15%	6.55%
7	United Kingdom	5.84%	5.89%
8	Italy	4.12%	4.63%
9	Netherlands	3.92%	3.97%
10	Oil exp. countries	15.96%	11.30%
11	Sum	64.86%	61.83%
12			
13			
14	Efta + rest EU	12.32%	
15	Can, Aus, New Z.	5.05%	
16	Asia	6.45%	
17	Africa	2.81%	
18	Europe	3.22%	
19	Middle East	0.87%	
20	Western Hemisphere	4.43%	
21			
22	Total World Exports	100.00%	
23	Memorandum items:		
24	sum EU known	82.54%	
25	EU	36.66%	
26	Intra-EU	20.43%	
27	Extra EU	16.23%	
28			
29	Source: IMF, Direction of Trade Statistics		
30			
31	1987, % of world;	exports	trade
32		in %	in %
33	USA	10.75%	14.18%
34	Japan	9.83%	8.01%
35	Germany	12.51%	10.95%
36	France	6.31%	6.43%
37	United Kingdom	5.58%	5.99%
38	Italy	4.95%	5.06%
39	Netherlands	3.94%	3.86%
40	Oil exp. countries	5.23%	4.47%
41	sum	59.10%	58.94%
42			
43			
44	Efta + rest EU	14.23%	
45	Can, Aus, New Z.	5.60%	
46	Asia	11.77%	
47	Africa	2.06%	
48	Europe	3.02%	
49	Middle East	0.67%	
50	Western Hemisphere	3.55%	
51			
52	Total World Exports	100.00%	
53	Memorandum items:		
54	sum EU known	81.76%	
55	EU	40.70%	
56	Intra-EU	23.81%	
57	Extra EU	16.89%	
58			
59	Source: IMF, Direction of Trade Statistics		
60			
61	1992, % of world;	exports	trade
62		in %	in %
63	USA	12.13%	13.27%
64	Japan	9.22%	7.61%
65	Germany	11.64%	11.11%
66	France	6.40%	6.31%
67	United Kingdom	5.15%	5.46%
68	Italy	4.88%	4.92%
69	Netherlands	3.77%	3.62%
70	Oil exp. countries	5.14%	4.61%
71	Sum	58.35%	56.92%
72			
73			
74	Efta + rest EU	13.83%	
75	Can, Aus, New Z.	5.02%	
76	Asia	14.63%	
77	Africa	1.83%	
78	Europe	1.99%	
79	Middle East	0.74%	
80	Western Hemisphere	3.62%	
81			
82	Total World Exports	100.00%	
83	Memorandum items:		
84	sum EU known	80.57%	
85	EU	39.53%	
86	Intra-EU	24.28%	
87	Extra EU	15.25%	
88			
89	Source: IMF Direction of Trade Statistics		

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source	Currency denomination of exports by country or region, 1989							
	Dollar	Yen	Dmark	Fr.franc	Pound	It. lira	D. Guilder	other
Page (1981) and commission estimates	96.00%	0.20%	1.00%	0.70%	1.00%	0.20%	0.30%	0.60%
Page (1981) and Japanese Mof	65.70%	29.40%	1.90%	0.60%	1.10%	0.10%	0.60%	0.60%
Deutsche Bundesbank	7.20%	0.00%	82.50%	2.80%	1.40%	1.30%	1.20%	3.60%
Bdef (1981) and commission estimates	20.30%	0.10%	9.10%	60.50%	2.10%	1.50%	0.80%	5.60%
Page (1981) and commission estimates	17.00%	0.10%	3.00%	2.00%	76.00%	0.50%	1.00%	0.40%
B. d'Italia and commission estimates	30.00%	0.10%	14.00%	8.00%	2.40%	36.00%	1.00%	8.50%
DNB and commission estimates	16.50%	0.00%	21.50%	5.40%	4.20%	0.90%	43.50%	8.00%
Page (1981)	96.00%	0.00%	1.00%	1.00%	1.00%	0.00%	0.00%	1.00%
extrapolations								
(D5+D6+D7+D8+D9)/5	18.20%	0.06%	11.90%	4.55%	2.53%	0.68%	1.00%	61.09%
(2*D3+D4)/3	85.90%	0.20%	1.30%	0.67%	1.03%	0.17%	0.40%	10.33%
(2*D3+D4)/3	85.90%	0.50%	1.30%	0.67%	1.03%	0.17%	0.40%	10.03%
(2*D3+(D5+D6+D7+D8+D9)/5)/2	70.07%	0.15%	9.34%	5.71%	6.41%	2.81%	3.37%	2.14%
(D3+(D5+D6+D7+D8+D9)/5)/2	57.10%	0.13%	13.51%	8.22%	9.11%	4.12%	4.90%	2.91%
+D10	96.00%	0.00%	1.00%	1.00%	1.00%	0.00%	0.00%	1.00%
(3*D3+(D5+D6+D7+D8+D9)/5)/4	76.55%	0.17%	7.26%	4.46%	5.06%	2.16%	2.60%	1.76%
Source								
Currency denomination of exports, by country or region, 1987								
	Dollar	Yen	Dmark	Fr.franc	Pound	It. lira	D. Guilder	other
Commission estimates	93.00%	0.80%	1.20%	0.80%	0.90%	0.30%	0.40%	2.60%
MITI and commission estimates	54.60%	33.80%	3.00%	0.90%	1.50%	0.20%	0.50%	5.50%
Deutsche BUBA	7.40%	0.50%	81.50%	2.50%	1.80%	1.70%	0.90%	3.70%
Bdef (1988) and commission estimates	16.00%	0.70%	8.90%	58.20%	3.30%	2.60%	1.40%	8.90%
C. Stat. Off. and commission estimates	26.00%	0.50%	4.00%	3.40%	57.00%	1.30%	1.80%	6.00%
B. d'Italia and commission estimates	20.00%	0.40%	18.00%	9.00%	3.10%	38.00%	1.10%	10.40%
De Nederlandse Bank	16.90%	0.30%	18.60%	4.80%	5.30%	1.50%	45.70%	6.90%
Black, (1989)	92.00%	0.00%	2.00%	2.00%	2.00%	2.00%	0.00%	0.00%
Extrapolations								
(D5+D6+D7+D8+D9)/5	17.26%	0.48%	12.38%	4.93%	3.38%	1.78%	1.30%	58.51%
(2*D3+D4)/3	80.20%	1.10%	1.80%	0.83%	1.10%	0.27%	0.43%	14.27%
(2*D3+D4)/3	80.20%	2.10%	1.80%	0.83%	1.10%	0.27%	0.43%	13.27%
(2*D3+(D5+D6+D7+D8+D9)/5)/3	67.75%	0.69%	9.53%	5.73%	5.30%	3.21%	3.66%	4.13%
(D3+(D5+D6+D7+D8+D9)/5)/2	55.13%	0.64%	13.70%	8.19%	7.50%	4.66%	5.29%	4.89%
+D10	92.00%	0.00%	2.00%	2.00%	2.00%	2.00%	0.00%	0.00%
(3*D3+(D5+D6+D7+D8+D9)/5)/4	74.07%	0.72%	7.45%	4.50%	4.20%	2.48%	2.85%	3.75%
Source								
Currency denomination of export, by country or region, 1992								
	Dollar	Yen	Dmark	Fr.franc	Pound	It. lira	D. Guilder	other
Commission estimates	92.00%	1.50%	1.30%	0.90%	0.90%	0.40%	0.60%	2.40%
MITI and commission estimates	46.60%	40.10%	3.30%	0.90%	1.60%	0.40%	1.00%	6.10%
BUBA and commission estimate	7.30%	0.30%	77.00%	3.30%	3.20%	2.20%	0.90%	5.80%
Bdef	16.50%	0.80%	10.40%	54.60%	4.10%	3.30%	1.50%	8.80%
C. Stat. Off. and commission estimates	22.00%	0.70%	5.00%	3.50%	62.00%	1.70%	2.30%	2.80%
B. d'Italia and commission estimates	18.00%	0.60%	19.00%	9.00%	3.00%	40.00%	1.30%	9.10%
De Nederlandse Bank	16.00%	0.50%	21.70%	4.80%	4.80%	1.80%	43.10%	7.30%
Oil exp. as 1987, Black (1989)	92.00%	0.00%	2.00%	2.00%	2.00%	2.00%	0.00%	0.00%
Extrapolations								
(D5+D6+D7+D8+D9)/5	15.96%	0.58%	14.03%	5.15%	3.78%	2.25%	1.50%	56.76%
(2*D3+D4)/3	76.87%	1.70%	1.97%	0.90%	1.13%	0.40%	0.73%	16.30%
(2*D3+D4)/3	76.87%	3.10%	1.97%	0.90%	1.13%	0.40%	0.73%	14.90%
(2*D3+(D5+D6+D7+D8+D9)/5)/3	66.65%	1.19%	9.74%	5.61%	5.74%	3.53%	3.67%	3.85%
(D3+(D5+D6+D7+D8+D9)/5)/2	53.98%	1.04%	13.96%	7.97%	8.16%	5.10%	5.21%	4.58%
+D10	92.00%	0.00%	2.00%	2.00%	2.00%	2.00%	0.00%	0.00%
(3*D3+(D5+D6+D7+D8+D9)/5)/4	72.99%	1.27%	7.63%	4.44%	4.53%	2.75%	2.91%	3.49%

6.9.2. Explanation of Worksheet Formulas

The pages 1 to 3 present a *part of the Worksheet Calculations*. The worksheet formulas gives another presentation of row D to L of worksheet *Calculations*. Here the formulas behind the numbers of worksheet *Calculations* are given.

We can see exactly how the estimations for denomination of exports in the ROW have been made. The motivation and explanation for the assumptions are given on Page 70. The estimations are weighted averages of the invoicing patterns of the US, Japan and Europe.

However, there are 2 exceptions. One exception is when we estimate the use of a currency in the rest of the other countries of the EU and EFTA. The other exception concerns the use of the yen in Asia and in Canada, New Zealand and Australia.

An estimate for the use of a currency in the group of countries *Other EU and EFTA* is made by taking the average use of that currency by the five European countries that provided data about their invoicing pattern. However, an estimate may not be made by taking the average of Europe 5 (see for example the estimation of the use of the dollar and the yen in EU and EFTA, at E-14 and F-14) when it concerns the estimation of a European currency that is one of the domestic currencies of the five European countries. *The use of a foreign currency may not be estimated with the use of this currency by the issuing country.* For example, the use of the pound in the rest of Europe cannot be based on the use of the pound in the UK. This implies that the use of pound sterling is estimated by the average use of pound sterling by Germany, France, Italy and the Netherlands, see Page 2, I-14 or I44. Similar is the use of the FF estimated by the average of Europe 4, excluding the use of the FF in France, see Worksheet Formulas on page 2, H-14.

The second exception concerns the use of the yen in Asia and in the region Canada, New Zealand and Australia. The invoicing behaviour in these regions is estimated by a weighted average of the invoicing behaviour of Japan and the US with a weight for the US of two-third and a weight for Japan of one-third. However, a similar problem with the estimation for the yen arises as the one mentioned in the paragraph before. *We may not approximate the use of the yen in Asia with the use of the yen in Japan, where it is the domestic currency.* This problem is solved by making separate estimations of the use of the yen in these regions, see annex II, Page 94. That is why no formulas appear in the column F with estimations about the use of the yen.

The case of the dollar is different. The *intensive vehicle use of the dollar* for denomination of international trade allows us to estimate the use of the dollar outside the US with the use of the domestic use of the dollar in the US. To what extent the dollar is used as a vehicle can be seen from some data available from Page (1981) and Scharrer (1979), see Page 70. Their data and estimations are consistent with our estimates for the use of the dollar in LDC's.

Currency denomination of exports, by country or region

A	D	E	F
1	source		
2	1980	Dollar	Yen
3	Page (1981) and commission estimates	0.960	0.002
4	Page (1981) and Japanese MoF	0.657	0.294
5	Deutsche Bundesbank	0.072	0.000
6	BdeF (1981) and commission estimates	0.203	0.001
7	Page (1981) and commission estimates	0.170	0.001
8	B. d'Italia and commission estimates	0.300	0.001
9	DNB and commission estimates	0.165	0.000
10	Page (1981)	0.960	0.000
11			
12			
13	extrapolations		
14	Efta + rest EU	$(E6+E5+E8+E9+E7)/5$	$(F6+F5+F8+F9+F7)/5$
15	Can, Aus, New Z.	$(2^*E3+E4)/3$	0.002
16	Asia	$(2^*E3+E4)/3$	0.006
17	Africa	$(2^*E3+(E6+E5+E8+E9+E7)/5)/3$	$(2^*F3+(F6+F5+F8+F9+F7)/5)/3$
18	Europe	$(E3+(E6+E5+E8+E9+E7)/5)/2$	$(F3+(F6+F5+F8+F9+F7)/5)/2$
19	Middle East	+E10	+F10
20	Western Hemisphere	$(3^*E3+(E6+E5+E8+E9+E7)/5)/4$	$(3^*F3+(F6+F5+F8+F9+F7)/5)/4$
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31	Source		
32	1987	Dollar	Yen
33	Commission estimates	0.930	0.008
34	MITI and commission estimates	0.546	0.338
35	Deutsche BUBA	0.074	0.005
36	BdeF (1988) and commission estimates	0.160	0.007
37	C. Stat. Off. and commission estimates	0.260	0.005
38	B. d'Italia and commission estimates	0.200	0.004
39	De Nederlandse Bank	0.169	0.003
40	Black, (1989)	0.920	0.000
41			
42			
43	Extrapolations		
44	Efta + rest EU	$(E36+E35+E38+E39+E37)/5$	$(F36+F35+F38+F39+F37)/5$
45	Can, Aus, New Z.	$(2^*E33+E34)/3$	0.011
46	Asia	$(2^*E33+E34)/3$	0.021
47	Africa	$(2^*E33+(E36+E35+E38+E39+E37)/5)/3$	$(2^*F33+(F36+F35+F38+F39+F37)/5)/3$
48	Europe	$(E33+(E36+E35+E38+E39+E37)/5)/2$	$(F33+(F36+F35+F38+F39+F37)/5)/2$
49	Middle East	+E40	+F40
50	Western Hemisphere	$(3^*E33+(E36+E35+E38+E39+E37)/5)/4$	$(3^*F33+(F36+F35+F38+F39+F37)/5)/4$
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61	Source		
62	1992	Dollar	Yen
63	Commission estimates	0.920	0.015
64	MITI and commission estimates	0.466	0.401
65	BUBA and commission estimate	0.073	0.003
66	BdeF	0.165	0.008
67	C. Stat. Off. and commission estimates	0.220	0.007
68	B. d'Italia and commission estimates	0.180	0.006
69	De Nederlandse Bank	0.160	0.005
70	Oil exp. as 1987, Black (1989)	0.920	0.000
71			
72			
73	Extrapolations		
74	Efta + rest EU	$(E66+E65+E68+E69+E67)/5$	$(F66+F65+F68+F69+F67)/5$
75	Can, Aus, New Z.	$(2^*E63+E64)/3$	0.017
76	Asia	$(2^*E63+E64)/3$	0.031
77	Africa	$(2^*E63+(E66+E65+E68+E69+E67)/5)/3$	$(2^*F63+(F66+F65+F68+F69+F67)/5)/3$
78	Europe	$(E63+(E66+E65+E68+E69+E67)/5)/2$	$(F63+(F66+F65+F68+F69+F67)/5)/2$
79	Middle East	+E70	+F70
80	Western Hemisphere	$(3^*E63+(E66+E65+E68+E69+E67)/5)/4$	$(3^*F63+(F66+F65+F68+F69+F67)/5)/4$

Currency denomination of exports, by country or region

G		H		I
Currency denomination of exports, by country or region, 1980				
	Dmark	Fr.franc		Pound
1				
2				
3	0.010	0.007		0.010
4	0.019	0.006		0.011
5	0.825	0.028		0.014
6	0.091	0.605		0.021
7	0.030	0.020		0.760
8	0.140	0.080		0.024
9	0.215	0.054		0.042
10	0.010	0.010		0.010
11				
12				
13				
14	(G6+G8+G9+G7)/4	(H5+H8+H9+H7)/4		(I6+I8+I9)/4
15	(2*G53+G54)/3	(2*H53+H54)/3		(2*I53+I54)/3
16	(2*G53+G54)/3	(2*H53+H54)/3		(2*I53+I54)/3
17	(2*G3+(G6+G5+G8+G9+G7)/5)/3	(2*H3+(H6+H5+H8+H9+H7)/5)/3		(2*I3+(I6+I5+I8+I9+I7)/5)/3
18	(G3+(G6+G5+G8+G9+G7)/5)/2	(H3+(H6+H5+H8+H9+H7)/5)/2		(I3+(I6+I5+I8+I9+I7)/5)/2
19	+G10	+H10		+I10
20	(3*G3+(G6+G5+G8+G9+G7)/5)/4	(3*H3+(H6+H5+H8+H9+H7)/5)/4		(3*I3+(I6+I5+I8+I9+I7)/5)/4
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31	Currency denomination of exports, by country or region, 1987			
32	Dmark	Fr.franc		Pound
33	0.012	0.008		0.009
34	0.030	0.009		0.015
35	0.815	0.025		0.018
36	0.089	0.582		0.033
37	0.040	0.034		0.570
38	0.180	0.090		0.031
39	0.186	0.048		0.053
40	0.020	0.020		0.020
41				
42				
43				
44	(G36+G38+G39+G37)/4	(H36+H38+H39+H37)/4		(I36+I38+I39+I37)/4
45	(2*G533+G534)/3	(2*H533+H534)/3		(2*I533+I534)/3
46	(2*G533+G534)/3	(2*H533+H534)/3		(2*I533+I534)/3
47	(2*G33+(G36+G35+G38+G39+G37)/5)/3	(2*H33+(H36+H35+H38+H39+H37)/5)/3		(2*I33+(I36+I35+I38+I39+I37)/5)/3
48	(G33+(G36+G35+G38+G39+G37)/5)/2	(H33+(H36+H35+H38+H39+H37)/5)/2		(I33+(I36+I35+I38+I39+I37)/5)/2
49	+G40	+H40		+I40
50	(3*G33+(G36+G35+G38+G39+G37)/5)/4	(3*H33+(H36+H35+H38+H39+H37)/5)/4		(3*I33+(I36+I35+I38+I39+I37)/5)/4
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	Currency denomination of exports, by country or region, 1992			
62	Dmark	Fr.franc		Pound
63	0.013	0.009		0.009
64	0.033	0.009		0.016
65	0.770	0.033		0.032
66	0.104	0.546		0.041
67	0.050	0.035		0.620
68	0.190	0.090		0.030
69	0.217	0.048		0.048
70	0.020	0.020		0.020
71				
72				
73				
74	(G66+G68+G69+G67)/4	(H66+H68+H69+H67)/4		(I66+I68+I69+I67)/4
75	(2*G563+G564)/3	(2*H563+H564)/3		(2*I563+I564)/3
76	(2*G563+G564)/3	(2*H563+H564)/3		(2*I563+I564)/3
77	(2*G63+(G66+G65+G68+G69+G67)/5)/3	(2*H63+(H66+H65+H68+H69+H67)/5)/3		(2*I63+(I66+I65+I68+I69+I67)/5)/3
78	(G63+(G66+G65+G68+G69+G67)/5)/2	(H63+(H66+H65+H68+H69+H67)/5)/2		(I63+(I66+I65+I68+I69+I67)/5)/2
79	+G70	+H70		+I70
80	(3*G63+(G66+G65+G68+G69+G67)/5)/4	(3*H63+(H66+H65+H68+H69+H67)/5)/4		(3*I63+(I66+I65+I68+I69+I67)/5)/4

Currency denomination of exports, by country or region

A	J	K	L
1			
2	fl. lira	D. Guilder	other
3	0.002	0.003	0.006
4	0.001	0.006	0.006
5	0.013	0.012	0.036
6	0.015	0.008	0.056
7	0.005	0.010	0.004
8	0.360	0.010	0.085
9	0.009	0.435	0.080
10	0.000	0.000	0.010
11			
12			
13			
14	(J6+J10+J8+J7)/4	(K6+K5+K8+K7)/4	1-E14-G14-F14-H14-H14-J14-K14
15	(2*J53+J54)/3	(2*K53+K54)/3	1-E16-G16-F16-H16-H16-J16-K16
16	(2*J53+J54)/3	(2*K53+K54)/3	1-E16-G16-F16-H16-H16-J16-K16
17	(2*J3+J6+J5+J8+J9+J7)/5/3	(2*K3+K6+K5+K8+K9+K7)/5/3	1-E17-G17-F17-H17-H17-J17-K17
18	(J3+(J6+J5+J8+J9+J7)/5)/2	(K3+(K6+K5+K8+K9+K7)/5)/2	1-E18-G18-F18-H18-H18-J18-K18
19	+J10	+K10	1-E19-G19-F19-H19-H19-J19-K19
20	(3*J3+J6+J5+J8+J9+J7)/5/4	(3*K3+K6+K5+K8+K9+K7)/5/4	1-E20-G20-F20-H20-H20-J20-K20
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32	fl. lira	D. Guilder	other
33	0.003	0.004	0.026
34	0.002	0.005	0.055
35	0.017	0.009	0.037
36	0.026	0.014	0.089
37	0.013	0.018	0.060
38	0.380	0.011	0.104
39	0.015	0.457	0.069
40	0.020	0.000	0.000
41			
42			
43			
44	(J36+J35+J39+J37)/4	(K36+K35+K38+K37)/4	1-E44-G44-F44-I44-H44-J44-K44
45	(2*J533+J534)/3	(2*K533+K534)/3	1-E46-G46-F46-I46-H46-J46-K46
46	(2*J533+J534)/3	(2*K533+K534)/3	1-E46-G46-F46-I46-H46-J46-K46
47	(2*J33+J36+J35+J38+J39+J37)/5/3	(2*K33+K36+K35+K38+K39+K37)/5/3	1-E47-G47-F47-I47-H47-J47-K47
48	(J33+(J36+J35+J38+J39+J37)/5)/2	(K33+(K36+K35+K38+K39+K37)/5)/2	1-E48-G48-F48-I48-H48-J48-K48
49	+J40	+K40	1-E49-G49-F49-I49-H49-J49-K49
50	(3*J33+J36+J35+J38+J39+J37)/5/4	(3*K33+K36+K35+K38+K39+K37)/5/4	1-E50-G50-F50-I50-H50-J50-K50
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62	fl. lira	D. Guilder	other
63	0.004	0.006	0.024
64	0.004	0.010	0.061
65	0.022	0.009	0.058
66	0.033	0.015	0.088
67	0.017	0.023	0.028
68	0.400	0.013	0.091
69	0.018	0.431	0.073
70	0.020	0.000	0.000
71			
72			
73			
74	(J66+J65+J69+J67)/4	(K66+K65+K68+K67)/4	1-E74-G74-F74-I74-H74-J74-K74
75	(2*J563+J564)/3	(2*K563+K564)/3	1-E75-G75-F75-I75-H75-J75-K75
76	(2*J563+J564)/3	(2*K563+K564)/3	1-E76-G76-F76-I76-H76-J76-K76
77	(2*J63+J66+J65+J68+J69+J67)/5/3	(2*K63+K66+K65+K68+K69+K67)/5/3	1-E77-G77-F77-I77-H77-J77-K77
78	(J63+(J66+J65+J68+J69+J67)/5)/2	(K63+(K66+K65+K68+K69+K67)/5)/2	1-E78-G78-F78-I78-H78-J78-K78
79	+J70	+K70	1-E79-G79-F79-I79-H79-J79-K79
80	(3*J63+J66+J65+J68+J69+J67)/5/4	(3*K63+K66+K65+K68+K69+K67)/5/4	1-E80-G80-F80-I80-H80-J80-K80

7. Annex III: Exchange rate regimes

The following worksheets give a further explanation of table 23 (page 46). Pages 1 and 2 give the exchange rate regimes of the different countries and their GDP. Page 3 presents the aggregated weights for the different exchange rate regimes.

The table is based on the table in the IMF annual report 1993, appendix II, Table II.18, pages 132-133. The weights of the countries in world GDP are based on the Chelem data for the GDP's of the different countries.

The weights are from the year 1991 which is the most recent year with GDP data for all countries. However, weights in GDP change very gradually so this is a good approximation for the GDP weight in the year 1993.

The final result of this exercise is shown in table 23 in the column with the GDP weights.

FLEXIBILITE PAR RAPPORT A UNE SEULE MONNAIE SME			REGIME PREVOYANT UNE PLUS GRANDE FLEXIBILITE							
			FLOTTEMENT DIRIGE			FLOTTEMENT INDEPENDANT				
DTS										
6489.646			FRANCE	1199290	GRECE	70575.328	ETATS-UNIS	5610800	INDE	246133.72
3325.3821	Bahrein	4292.3408	Belgique	196872.89	ISRAEL	63078.355	CANADA	582010.13	PHILIPPINES	44577.254
38844.32	Qatar	7657.8901	Luxembourg	9335.8945	TURQUIE	108004.66	JAPON	3362207.8	Afghanistan	5808.147
28234.945	Arab.Saoudi.	120973.49	ALL.FEDERALE	1574353.8	EQUATEUR	12067.486	AUSTRALIE	299813.81	Nepal	3131.291
23023.867	Emir.Ar.Unis	33784.043	PAYS-BAS	290829.31	MEXIQUE	274575.56	NLLE-ZELANDE	42861.262	Iran	350848.88
4148.6318			IRLANDE	43431.516	CHILI	31309.057	Afr. du Sud	107322.63	Liban	4252.314
1157.652		166707.77	DANEMARK	130256.73	COLOMBIE	43183.051	sous total A	10005016		
474.86499			ESPAGNE	527130.63	Uruguay	9570.8582			VENEZUELA	52720.172
8168.7988			Gibraltar	341.944	TUNISIE	13108.417			BRESIL	431006.31
2177.0491			PORTUGAL	68613.391	Madagascar	2661.342	ITALIE	1150516	Bolivie	4997.2559
2639.5181			Guadeloupe	1552.316	Guinee	3632.887	ROYAUME-UNI	1009525.6	Costa Rica	5574.0762
1129.637			Guyane Fran.	242.88699	Guinee-Biss.	211.313	FINLANDE	124424.09	Guyane	333.36499
2551.509			Martinique	2039.835	Sao Tome &P.	55.625	NORVEGE	105929.29	Guatemala	9385.0723
5815.9678			Reunion	2791.2151	Somalie	766.16101	SUEDE	236945.69	Haiti	2679.1399
46676.094			Nie Caledon.	1366.287	INDONESIE	114224.35	SUISSE	231997.91	Honduras	6340.125
91716.031			RDA	136750.58	COREE DU SUI	274268.88	sous total B	2859338.5	Jamaique	3354.114
23135.297					SINGAPOUR	39380.969			PEROU	41172.297
1487.3311				4185199.2	TAIWAN	175587.89			Rep.Dominic.	7475.2412
172.304					Sri Lanka	9208.4482	EX-URSS	1961329.3	Paraguay	5748.3921
3809.4189					POLOGNE	194646.72	BULGARIE	42817.941	Trinite-&-T.	5134.3428
123.257					CHINE	697057.13	ROUMANIE	90826.492	Salvador	6621.1108
					Laos		sous total C	2094973.7		
					Vietnam				NIGERIA	35212.449
					EGYPTE	47713.805			Gambie	252.53101
					Maldives	150.784			Ghana	6834.5879
									Mozambique	4247.7271
						2185036.9	total float	16282303	Ouganda	3441.939
									Sierra Leone	828.16498
									Soudan	22648.481
									Zaire	7460.0381
									Zambie	4956.5771
									sous total	1322975.1

TAUX DE CHANGE ETABLI PAR REFERENCE

A UNE SEULE MONNAIE	387709.97	1.6168899	
FF	50357.499	0.2100089	
DOLLAR	332200.85	1.3853969	
AUTRE MONNAIE	5151.6271	0.0214841	
A UN PANNIER DE MONNAIES	557055.15	2.3231201	
DTS	14812.382	0.061773	
AUTRE QUE DTS	542242.77	2.2613471	
FLEXIBILITE PAR RAPPORT	4351906.9	18.149015	
A UNE SEULE MONNAIE (USS)	166707.77	0.6952313	
SME	4185199.2	17.453784	
REGIME PREVOYANT UNE PLUS GRANDE FLEXIBILITE	18467340	77.015441	
FLOTTEMENT DIRIGE	2185036.9	9.1123886	
FLOTTEMENT INDEPENDANT	16282303	67.903052	
Dt A	10005016	41.724509	
Dt B	2859338.5	11.924469	
Dt C	2094973.7	8.7367928	
total ces divers	214737.91	0.8955342	
MONDE chelem	24045434		
total monde identifié ici	23978750		
reste	66684.28		

8. Annex IV: Contacts at central banks and other sources

UNITED STATES:

Labour Department

via: Delegation of the Commission of the European Communities in Washington

Ms A. Vorce

JAPAN:

Ministry of Finance and Ministry of International Trade and Industry

via: Delegation of the Commission of the European Communities in Tokyo

Mr R. Wilkinson.

GERMANY:

Deutsche Bundesbank

Mr Köhler

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THE NETHERLANDS:

De Nederlandsche Bank

Mr P.Kramer

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