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CHAPTER 5: ASPECTS OF TRADE GLOBALISATION

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CHAPTER 5

ASPECTS OF TRADE GLOBALISATION

5.1. Introduction

1. International trade in goods and services is a major component of the globalisation process. OECD countries have made a major effort to reduce barriers to trade and to make their economies more open to foreign competition, which has contributed to the international integration of their economies. Their success in doing so is attested by the fact that the volume of world merchandise trade at the end of the 1990s was 16 times that in 1950. During the same period, its weight in world GDP tripled.

2. The first part of this chapter outlines a number of trade-related indicators that need to be developed, and more specifically the reference indicators proposed in Chapter 1. These indicators reflect: i) the importance of the trade in national economies, and ii) the role played by multinational indicators in that trade.

3. The second part of this chapter examines various methodological and conceptual problems involved in developing these indicators and, as in the other chapters, puts forward recommendations concerning the definition and collection of basic data for national authorities. The new aspects of trade addressed in this part include, essentially, intra-firm trade, trade in intermediate products and intra and extra-regional trade.

4. The third part of the chapter looks at a number of experimental indicators, such as trade balances based on capital ownership, international sub-contracting and intra-industry trade.

5.2. Proposed indicators

5.2.1. Choice of indicators

5. A set of core reference indicators, a broader set of supplementary indicators and a few experimental indicators are proposed in Box 5.1 to examine those issues deemed of interest to analysts and policymakers that explore the following questions, including:

- How integrated or global is the domestic economy from the trade point of view?
- What is the role and importance of multinational enterprises in trade?
- Do multinational enterprises trade more with their affiliates than with unaffiliated firms?
- What is the impact of exports on domestic value added and employment?
- What share of domestic demand is met by imports?
- What is the degree of dependence of domestic producers on foreign markets and imported inputs?
- How important are affiliates controlled abroad in delivering goods and services to international markets?
- Does the trade balance based on ownership or control provides a different picture from the conventional method of measurement?

5.2.2. Reference indicators

6. In Chapter 1 concerning trade, 8 reference indicators are proposed. The first four measure the extent of trade globalisation in the compiling country, while the last four refer to the importance of foreign CAs in the compiling country's trade. These indicators are presented in Box 5.1. This box also displays the supplemental and experimental indicators proposed in this *Handbook*. The analytical interest of the

indicators and certain problems posed by their use and interpretation are discussed in the second and third parts of the chapter.

7. The indicators proposed are not intended to be indicators of market openness in the sense of markets being contestable by foreign suppliers. While they reflect the existence or changes in tariffs, non-tariff border protection and other types of institutional arrangements that limit effective contestability, they also reflect factors that do not relate to trade policy, such as the country's size, geographic isolation from trading partners and transport costs. At the sectoral level, furthermore, these indicators also reflect macroeconomic developments such as fluctuations in aggregate demand and exchange rates.

Box 5.1. Proposed indicators for measuring the extent of trade globalisation

1. Reference indicators

Extent of trade globalisation in the compiling country (total)

- Share of total exports in GDP
- Average of exports and imports in GDP
- Share of domestic final demand met by total imports
- Share of GDP linked to domestic exports

Extent of trade globalisation related to foreign-CAs in the compiling country (total)

- Foreign-CAs' share of total exports
- Foreign-CAs' share of total imports
- Extent of trade globalisation related to foreign affiliates in the compiling country (total)
- Intra-firm exports of goods by foreign-CAs in total exports of goods
- Intra-firm imports of goods by foreign-CAs in total imports of goods

2. Supplemental indicators

Extent of trade globalisation in the compiling country

- Propensity to export by industry
- Penetration of imports to meet domestic final demand
- Penetration of imports to meet, intermediate demand
- Penetration of imports to meet total domestic demand
- Foreign penetration ratio

Extent of trade globalisation related to parents in the compiling country (total for all parent companies and parent companies controlled by residents)

- Parent companies' share of total compiling country exports
- Parent companies' share of total compiling country imports
- Intra-firm exports of goods by parent companies in total exports of goods
- Intra-firm imports of goods by parent companies in total imports of goods

Extent of trade globalisation related to MNEs in the compiling country (total)

- MNEs' share of total compiling country exports
- MNEs' share of total compiling country imports
- Intra-firm exports of goods by MNEs in the total exports of goods
- Intra-firm imports of goods by MNEs in the total imports of goods

Extent of international integration of production and distribution processes

- Import content of compiling country production
- Import content of compiling country exports
- Share of re-exports in compiling country GDP
- Share of intermediate goods in compiling country merchandise exports
- Share of intermediate goods in compiling country merchandise imports

Degree of geographic diversification (globalisation) of trade in the compiling country

- Herfindahl index of total exports
- Herfindahl index of total imports

3. Experimental indicators

- Trade balances based on capital ownership
- New forms of trade relationships
- Intra-industry trade

5.2.2.1. *Extent of trade globalisation in the compiling country*

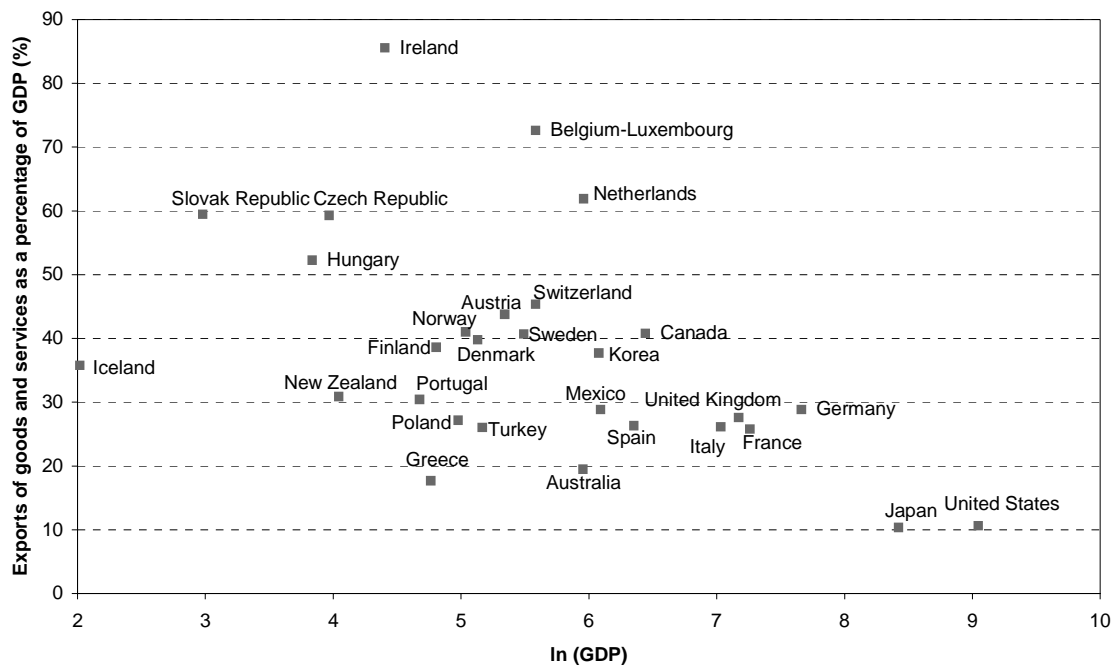
Share of total exports in GDP

8. This is probably the most frequently used indicator of trade intensity, since it provides a measure of the degree of dependence of domestic producers on foreign markets, and their trade orientation. It is based on well-established concepts and the relevant data are readily available. The share of exports in GDP can be analysed in terms of level and in terms of growth. As pointed out in Chapter 1, in the case of some countries, this indicator may not show significant growth if, during the reference period, services that are not traded internationally and that are included in GDP grow more rapidly than exports. In terms of level, this ratio may indicate the intensity of a country's trade. However, it must be interpreted in light of i) a country's geographical proximity to its main trading partners; and here the importance that costs, such as transport and marketing, may have for trade flows; and ii) size of the economy. In this regard, smaller economies are often obliged to specialise in certain activities, which may result in a relatively high share of exports in GDP. Figures 5.1 and 5.2 show that the negative correlation between GDP and the share of exports in GDP is not particularly strong, suggesting that other factors influence the ratio, especially in the cases of small countries where large disparities across countries exist. This indicator includes both domestic exports and re-exports that correspond to different globalisation dynamics. Supplemental indicators based on these trade flows are discussed later in this chapter.

Average of exports and imports in GDP

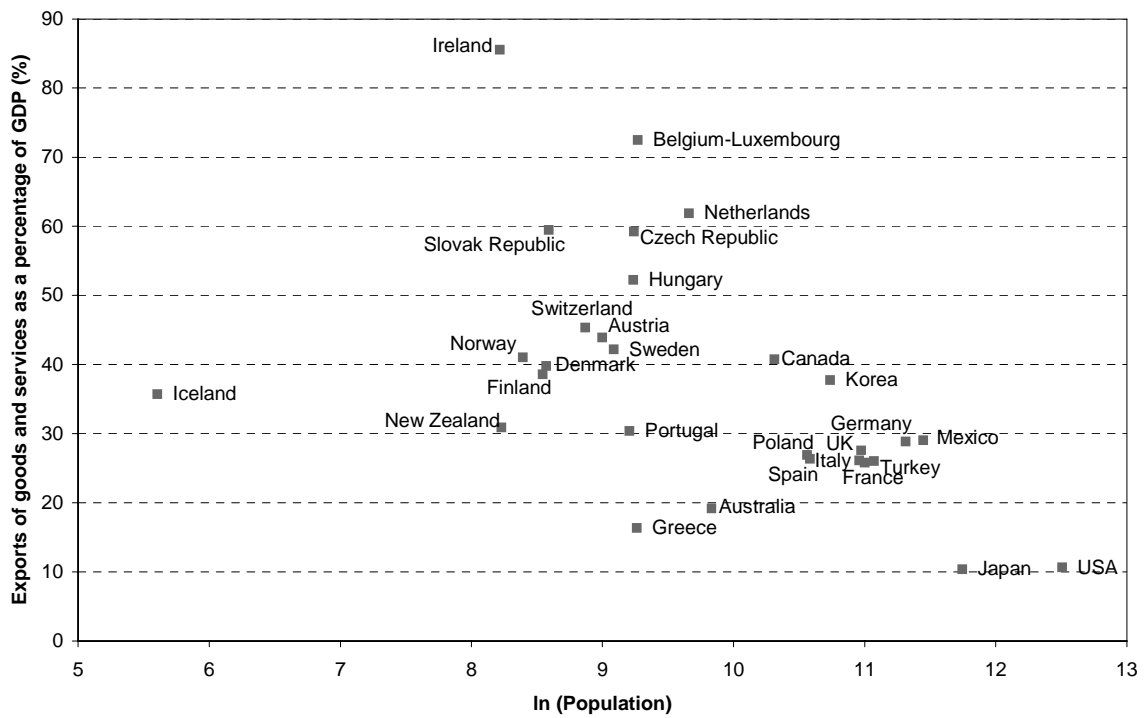
9. A second indicator that is often used to measure a country's integration in the world economy is the weight of its total trade in its economy, i.e. the average of exports and imports in GDP. However, it should be pointed out that this indicator should not be interpreted as a measure of openness to international trade since two countries can have the same values for this ratio but enforce differing levels of restrictions and tariff and non-tariff barriers.

Figure 5.1. Links between GDP and exports/GDP



Source: IMF balance of payments statistics, OECD Annual National Accounts, January 2003.

Figure 5.2. Links between population and exports/GDP



Source: IMF balance of payments statistics, OECD Annual National Accounts, January 2003.

Share of domestic final demand met by total imports

10. A third way of evaluating a country's integration in the world economy is to measure the share of total domestic final demand which is met by imports. As was the case with the share of total exports to GDP ratio some care should be made in interpretation. For example, small economies or those rich in mineral resources may tend to specialise in their production, and so import higher proportions of goods to meet total domestic final demand than would be the case in relatively large economies. Other factors are likely to affect the relationship too, for example the relative size of the service sector.

Share of GDP linked to domestic exports

11. This indicator serves to measure the contribution of exports to GDP in terms of the revenue they generate to the economy, rather than as a share of GDP (X/GDP).

12. Its interest lies in that it shows that two different countries may have identical export rates (X/GDP), but that the share of GDP directly and indirectly linked to exports may be very different in the two countries; reflecting differences in the import content of their exports (that is imports used in the production process to make exports). The development of these indicators requires the use of input-output tables (see section 5.3.1. for an exposition of how these indicators can be calculated).

5.2.2.2. Extent of trade globalisation related to foreign-CAs in the compiling country

13. These indicators show the role of foreign-CAs in host countries' trade. It would be desirable that these indicators also be constructed by industrial sector and country of origin and destination but the reference indicators only relate to totals.

Foreign-CAs' share of total exports and of total imports

14. These two indicators measure the importance of foreign-CAs in total exports and imports of the compiling country. In many countries, foreign-CAs have a propensity to export (exports/gross production) that is higher than the national average, and a propensity to import (imports/gross production) that is also higher than the national average.

15. With regard to the importance of foreign-CAs in total imports of the compiling country, it needs to be stressed that many parent companies sell their products through their foreign affiliates for reasons of commercial strategy, which means that those affiliates have a high propensity to import. It would also be interesting to look at the contribution that foreign-CAs make to the host country's overall trade balance.

Intra-firm exports of goods by foreign-CAs in total exports of goods and intra-firm imports of goods by foreign-CAs in total imports of goods

16. These are indicators used to measure a particular category of trade by multinationals – trade between an affiliate and its other parent company and other foreign affiliates of the same group (intra-firm trade). These indicators were developed exclusively for total goods and it would also be possible to construct them by industrial sector and country of origin and destination. It would, on the other hand, be more difficult to construct them for services.

17. This category of trade is a sub-category of the total trade by foreign-CAs, but it is of particular interest in that it reveals the intensity of commercial links between affiliates and parent companies. When an affiliate has a commercial or distribution function, its parent company's exports to that affiliate could represent the bulk of this trade. If the affiliate is rather a producer of semi-finished goods (intermediate goods), the parent company probably imports them to a large extent in order to manufacture finished

goods, possibly for re-export to other destinations. Methodological and conceptual aspects of intra-firm trade will be discussed in the second part of this chapter.

5.2.3. Supplemental indicators

5.2.3.1. Extent of trade globalisation in the compiling country

18. These indicators provide further measures of the extent of trade globalisation in the compiling country. They complement the corresponding reference indicators.

Propensity to export by industry: share of exports (X_{ij}) of a country i and industry j in the gross production (P_{ij}) of that country (X_{ij}/P_{ij})

19. For a compiling country, this is an important ratio for measuring the trade intensity of one of the industries, which is usually called the propensity to export. To calculate it, exports and production have to be measured using the same industrial classification such as ISIC Rev.3 or NACE Rev.1, unless production data are available in a product classification (SITC Rev.3, HS or CPC). One difficulty that should be borne in mind in making international comparisons is the importance of sectors' secondary activities. There are several methods of estimating exports by industry, each of which treats secondary activities differently.

- If the totality of the exports of a product is assigned to the industry that is specialised in producing it, exports related to an industry's secondary activities are all assigned to a single industry.
- If the exports of a product are assigned to all the industries that produce it in proportion to their share of production, export data by industry reflect their primary and secondary activities.
- If exports by industry are estimated from industrial surveys, they will reflect the industry's primary and secondary activities. However, if the survey is one of exporters, the exporter may not be the producer, which makes it difficult to interpret the export/production ratio. In such surveys, the wholesale trade is a big exporter even though it does not produce any goods, or very few.

20. This *Handbook* recommends that exports by industry be estimated by the second approach. Unfortunately, such estimates are not available for many countries. Even in the case of countries that do compile data in this way, they are still difficult to interpret, since the weight of an industry's main activity (degree of specialisation) may vary widely from one country to the next. This is a difficulty however that is not specific to trade or production data. Another factor to consider when using this indicator is the vertical integration within industry groupings. For example, in country (A) the motor vehicle manufacturer sources a large proportion of its parts from other domestic motor vehicle parts manufacturers. All of this output is recorded in the same two-digit ISIC activity 34 and so P_{ij} , will record the output of all of these activities. The motor vehicle manufacturer in country (B) however produces all parts within the company, and so P_{ij} , will be lower in this case even if the manufacturers in country (A) and (B) produce the same quantity of identical cars.

21. A better indicator could be attained by removing from the denominator P_{ij} , any intra-industry transactions between domestic industries (see section 5.4.3).

Penetration of imports (P_M) to meet domestic final demand (DF), intermediate demand (DI) and total domestic demand (DT).

22. These supplementary indicators are variants of the proposed reference indicator (3) shown in Box 5.1 above. To understand them properly, it is worth recalling an accounting principle of input-output tables. The total demand for a good in an economy is equal to the total supply of that good. Total domestic demand (DT) is the sum of intermediate consumption (DI) and domestic final demand (DF). Total supply for domestic consumers is the sum of domestic supply (gross production less exports) and external supply (imports).

23. Insofar as total domestic demand can be broken down into a component for intermediate consumption and a component for domestic final demand, imports can be intended for each of the two components. The reference indicator for import penetration is therefore biased since the denominator denotes only domestic final demand but the numerator includes all imports, some of which are used to produce goods for export. The supplementary indicators for import penetration shown below attempt to remedy this shortcoming. The total imports/total domestic demand ratio may be written as follows:

$$PM = M / DT = (MI + MF) / (DI + DF) \text{ where}$$

PM = import penetration (adjusted).

M = total imports.

DT = total domestic demand.

MI = imports for intermediate demand.

MF = imports for domestic final demand.

DI = intermediate demand.

DF = domestic final demand.

24. For a proper understanding of this indicator, two underlying indicators need to be developed:

$$PM = MI / DI \text{ and } PMF = MF / DF \text{ where}$$

PMI = penetration of imports for intermediate demand ; and

PMF = penetration of imports for final demand.

25. The first indicator (PMI) measures the degree of international integration of the production process but also the degree of vertical integration within the domestic industry. A better indicator would be to measure DI net of domestic intra-industry transactions. It should be noted that the more detailed the classification of industries the lower the bias introduced by not correcting for intra-industry transactions. The second indicator (PMF) measures the share of final demand met from abroad (imports).

26. The global indicator is the weighted sum of these two components:

$$PM = PMI * \frac{DI}{DT} + PMF * \frac{DF}{DT}$$

27. This relation shows that a country's global indicator of import penetration depends on the degree of import penetration and the weight of each type of demand. Furthermore, each component depends on the degree of penetration at industry level and the weights of the industries. Cross-country differences thus

reflect differences between the penetration ratios specific to an industry as well as differences in industrial structure. Industry level import penetrations would be useful to sort out these two effects but their computation requires several simplifying assumptions. This *Handbook* encourages countries to use the method proposed above to experiment with the estimation and analysis of industry level import penetration ratios.

Foreign penetration ratio

28. When foreign-CAs are present in a host country's economy, they may be regarded as the competitors of firms controlled by the residents of that country. The import penetration ratio which is proposed as a reference indicator could thus be widened. A foreign penetration ratio P_R could be defined which takes into account the share of foreign firms in local production plus total imports

$$P_R = (S_F - X_F + M) / DF \text{ where}$$

S_F = local sales of foreign-CAs.

X_F = exports of foreign-CAs.

M = total imports.

DF = final domestic demand.

29. If imports by foreign-CAs intended for their own production are available (M_{FP}), then the foreign penetration P'_R could be adjusted as follows:

$$\text{Adjusted foreign penetration ratio: } P'_R = (S_F - X_F + M - M_{FP}) / DF$$

5.2.3.2. Extent of trade globalisation related to parent companies in the compiling country

30. These indicators show the role of parent companies in host countries' trade. It would be desirable that these indicators also be constructed by industrial sector and country of origin and destination but the reference indicators only relate to totals.

Parent companies' share of total exports and of total imports

31. In Chapter 3, two categories of parent company located in a compiling country were distinguished:

- Parent companies under the ultimate control of residents of the compiling country (e.g. General Motors in the United States, Toyota in Japan).
- Foreign-controlled parent companies (e.g. Chrysler in the United States).

32. Each of these two categories has CAs abroad. When measuring the share of exports by the parent companies of a country in the total exports of that country, it is important to distinguish the exports from each of the two categories of firm. For exports, two indicators could be constructed:

$$X_{Parent, dc} / X \text{ and } X_{Parent, fc} / X$$

where

$X_{Parent, dc}$ = exports by parent companies under domestic ultimate control

$X_{Parent, fc}$ = exports by parent companies under foreign ultimate control;

X = Total exports of the compiling country.

33. Equivalent ratios can be calculated for imports.

34. Parent company exports in a compiling country are distinguished from exports by other firms, the majority of which are SMEs. Because of their size, sector and especially the degree of their internationalisation, the share of exports by parent companies is usually very large in a country's exports and imports.

Intra-firm exports of goods by parent companies in total exports of goods and intra-firm imports of goods by parent companies in total imports of goods

35. These indicators are used to assess the degree of international integration of compiling country firms as measured by trade flows. A higher share of parent companies' intra-firm exports (imports) in relation to total exports (imports) shows that the compiling country is more integrated with the rest of the world in terms of corporate relationships. These indicators were developed exclusively for total goods but it would also be possible to construct them for services and by industrial sector and country of origin and destination.

5.2.3.3. Extent of trade globalisation related to MNEs in the compiling country

36. These indicators are simply the addition of the foreign-CAs' and parent companies' corresponding indicators. They are a more global measure of the extent of trade globalisation due to MNEs in the compiling country. Where intra-firm trade is concerned, the data corresponding to foreign-CAs measure flows between the latter and their parent company group abroad, whereas the data for parent companies in the compiling country measure flows between the latter and their affiliates abroad.

5.2.3.4. Extent of international integration of production and distribution processes

37. The globalisation of production and distribution is one of the key characteristics of economic globalisation. It explains part of increasing trade at the world level. The degree of international integration can be measured by several trade-related indicators that are described below.

Import content of the production and exports of the compiling country

38. As pointed out earlier, a proportion of imports of goods is intended for use in production of exports. This supplemental indicator measures the importance of imports in the production process of exports. A higher import content reflects a higher integration of production with other trading countries. section 5.3.1 provides details on how to compute the share of GDP related to exports. This indicator is in essence the corollary of reference indicator 4 shown above, since the sum of GDP generated to produce one-unit of export and imports used in producing one-unit of export is 1.

Share of re-exports in the GDP of the compiling country

39. One aspect of globalisation that affects trade is the internationalisation of the distribution of goods. Some countries have become important distribution centres for regional markets. This indicator tries to capture this phenomenon. Countries with higher share would tend to play a relatively more important role in the global distribution of goods. This indicator complements the analysis of the share of total exports in GDP, as it provides the portion related to distribution. This proportion needs to be taken into account as re-exports usually don't generate as much value added and employment as domestic exports.

Share of intermediate goods in the compiling country's merchandise exports and imports

40. One feature of the internationalisation of production is the multiple origins of the components of a particular product. These components are very often produced in different countries and imported in order to be used for the production of final goods. The source of these imports could be affiliates of parent companies or other non-affiliated firms. Box 5.4 discusses in more details the role of trade in intermediate trade within the international division of production processes.

41. The importance and extent of these imports are taken into account by measuring the import content of production and exports (see indicators proposed above). However, other indicators may also be useful for measuring the following:

- Share of exports and imports of intermediate goods in total exports and imports of a country.
- Imports of intermediate goods a) by parent companies located in the compiling country, b) by the affiliates under foreign control in the compiling country, and c) by other non-affiliated firms.
- Share of imports of intermediate goods in intra-firm imports.
- Share of imports of intermediate goods in intra-industry imports.
- Geographical diversification of intermediate goods imports.

42. All these indicators are useful to the comprehensive analysis of the degree of integration of the production processes. Not all of them are however presented in the list of reference indicators.

*5.2.3.5. Degree of geographic diversification (globalisation) of trade in the compiling country**Herfindahl index of total exports and Herfindahl index of total imports*

43. If trade intensity indicators, such as X/GDP are similar for two countries, it may be helpful for some comparative purposes to measure the geographical diversification of exports using the Herfindahl index of concentration. The most internationalised country will be the one which exports its goods to the largest number of countries which are very far away and which have no common borders.

44. We assume that X represents the total exports of compiling country A j, which are destined for n different countries.

45. Herfindahl's index of geographical concentration for country A's exports is the sum of the squares of the market shares held in each country of destination i , *i.e.*

$$H = \sum_{i=1}^n \left[\frac{X_i}{\sum_{i=1}^n X_i} \right]^2$$

46. If each of the n countries of destination received the same export value, the Herfindahl index would be equal to:

$$H = \frac{1}{n} \quad (\text{see also Chapter 2, Annex 2.5, Box 1})$$

47. Countries which receive very low export values influence the Herfindahl index very little and can if necessary be left out of the calculations. Herfindahl indexes can also be computed for imports.

5.2.4. *Experimental indicators*

5.2.4.1. *Trade balances based on capital ownership*

48. Trade balances based on capital ownership are experimental estimates that can be used to develop new globalisation indicators and to assess trade flows based on capital ownership rather than residency. Conventional trade flows measure the flow of goods and services across borders. Foreign direct investment represents another way to deliver products to other markets without crossing borders. Trade balances based on capital ownership try to take account of these "deliveries". Section 5.4.1 provides the conceptual framework for developing these trade balances and some of the results from the United States.

5.2.4.2. *New forms of trade relationships*

49. One of the key features of economic globalisation is the rapid development of telecommunications. This has favoured the emergence of new forms for relationships between buyers and sellers and between producers. These new forms of trade relationships can explain an increasing share of trade flows. In fact, the share of intra-firm trade between Canada and the United States diminished after the Free Trade Agreement between these two countries, in spite of increased economic integration. This suggests that other forms of trading arrangements – other than through corporate integration – are at work. The following presents some possible trade relationships that facilitate trade:

- International sub-contracting: firms contracting some aspects of product design, processing, etc. to other foreign firms.
- Distribution arrangements: distributors and producers forming alliances for the production and distribution of goods and services.
- Electronic commerce: the rapid evolution of Internet and electronic commerce has facilitated the international distribution of goods and services, opening trade flows to all economic agents of all sizes.

50. The first two forms of trading relationships are not necessarily new but they seem recently to have become an increasing source of trade. "Seem" is used because there is not much data to verify this assertion. There are no data measuring the first two phenomena. France has launched a qualitative survey

in early 2003 to start obtaining information about the different types of relationship including international sub-contracting that firms can form to improve their performance. Electronic international commerce is measured by several countries. This *Handbook* encourages countries to develop these measures for future inclusion. This *Handbook* contributes to this endeavour by suggesting a definition and conceptual framework for the development of statistics on international sub-contracting (see section 5.4.2).

5.2.4.3. *Intra-industry trade*

51. International trade is often characterised in terms of the principle of comparative advantage, based on relative cost or price differentials across countries. A country exports goods produced by it in which it enjoys comparative advantage, and imports other goods produced by industries that are at a disadvantage. Regardless of transport costs, for instance, international trade can be expected to take place between countries that are economically different (in terms of technological know-how, capital intensity or resource endowments), and its form should be the same in each industry, i.e. exports (where there is a competitive advantage) or imports (where there is a comparative disadvantage). The classic pattern is therefore “inter-industry” trade between countries that differ.

52. In practice, however, most international trade takes place between countries that are developed (and in many respects economically similar) and it often takes the form of “intra-industry” trade, i.e. simultaneous exports and imports within industries. It usually takes place between wealthy countries that have reached a similar level of development, are reasonably open to foreign producers, and where geographic proximity implies low transport costs.

53. Emerging in the late 1970s, the “new theory of international trade” laid emphasis on the imperfection of competition by incorporating many aspects of industrial economics such as economies of scale or product differentiation¹. The new theory provided a simple explanation for the expansion observed in intra-industry trade, namely that, between similar countries, consumer demand for often differing ranges of similar (horizontally differentiated) goods produced with increasing returns will be met by *producer* specialisation.

54. In the mid-1980s, Helpman and Krugmann (1985)² succeeded in bringing the two schools of thought around the notion of integrated equilibrium. They associate monopolistic competition with intra-industry trade in similar goods between similar countries, whereas the principle of comparative advantage still holds for inter-industry trade between widely differing economies, i.e. those separated by a marked difference in the proportion of factors or levels of technology. Thus intra-industry trade is viewed as the corollary to economic integration: greater integration between similar and/or convergent countries is said to generate new gains in trade, while limiting the adjustment costs incurred when resources are moved between industries in a country. This new theory strongly influenced economic policy, one example being the *ex ante* studies on the impact of the Single Market in Europe.³

55. It would be desirable to estimate the proportion of trade accounted for by intra-industry trade as an indicator of the degree of economic integration between economies. However, attempts to measure intra-industry trade have been criticized because they suffer from aggregation bias (see section 5.4.3) for further discussion. This *Handbook* encourages researchers to perfect these measures so that they can finally be used as globalisation indicators.

5.2.5. *Variables required and availability*

56. Box 5.2 lists the variables required to construct the proposed globalisation indicators related to trade, except for trade related to MNEs that are presented in Box 3.2 (Chapter 3). Except for the experimental indicators, the variables are readily available in all OECD countries. It should be noted

however that the input-output tables are not as current as the other accounts in the SNA and are not published every year in most countries.

Box 5.2. Data required to construct globalisation indicators related to trade*

Variables	Availability in the OECD countries		
	Available in most countries		Not or rarely available
<i>GDP, final consumption expenditure accounts</i>			
Total GDP	X		
Total exports	X		
Domestic exports	X		
Re-exports	X		
Total imports	X		
<i>Input-output tables</i>			
Use matrix	X		
Supply matrix	X		
Final demand matrix	X		
<i>GDP, production accounts</i>			
Gross output by industry	X		
<i>Trade statistics by country of origin and destination</i>			
Total exports	X		
Total imports	X		
<i>Trade balances based on capital ownership</i>			X
<i>New forms of trade relationships</i>			X
<i>Intra-industry trade</i>			X
* Variables related to trade by MNEs are shown in Box 3.2.			

5.3. Conceptual and methodological considerations

5.3.1. Computing input-output based indicators

57. An important but less known aspect of globalisation is the link between a country's imports and production and exports. This link may be complex if a number of countries are producing parts of the same final goods and services.

58. One way of measuring the relationship is through the use of input-output tables. Input-output tables measure the interrelationships between the producers of goods and services (including imports) within an economy and the users of these same goods and services (including exports). In this context they can be used to estimate the contribution that imports make in the production of any good (or service) for export. For example, if a motor car manufacturer imports certain components (e.g. the chassis) the *direct import contribution* will be the ratio of the value of the chassis to the total value of the car. And if the car manufacturer purchases other components from domestic manufacturers, who in turn use imports in their production process, those imports must be included in the car's value. These indirect imports should be included in any statistic that attempts to measure the contribution of imports to the production of motor cars for export. The total direct and indirect imports are known as 'embodied imports'.

59. In an input-output framework the relationship between producers and consumers can be simply described as follows:

$$g = A * g + y$$

where:

g: is an $n \times 1$ vector of the output of n industries within an economy.

A: is an $n \times n$ matrix describing the interrelationships between industries (I-A) is known as the Leontief matrix, where a_{ij} is the ratio of inputs from domestic industry i used in the output of industry j .

Y: is an $n \times 1$ vector of final demand for domestically produced goods and services, including domestic exports.

60. Assuming that no other imports (re-exports) are recorded, total imports embodied within exports can be shown as:

$$\text{Embodied imports} = m * (I - A)^{-1} * e \quad (1)$$

where:

m: is a $1 \times n$ vector with components m_j (the ratio of intermediate imports purchased to output produced, in industry j)

e: is a $n \times 1$ vector of exports by industry.

61. Estimates of imports of goods embodied in exports of goods can be calculated by including only imported goods in « m », and setting all exports of services in e above to zero, assuming that goods industries produce goods only and services industries produce services only. By adapting the equation above to reflect Supply-Use table data sources this assumption can be relaxed. In this case Equation 1 above can be rewritten as $m * (I - DB)^{-1} * Dx$, where x is a $n \times 1$ vector of exports by product, $DB = A$ and $Dx = e$, B is an $n \times n$ matrix where b_{ij} is the ratio of inputs of domestically produced product i used in the output of industry j . This approach can be applied to the equations below by replacing each occurrence of “A” and “e” with “DB” and “Dx”.

62. And so the « import content of exports » (the share of imports used in production to make one unit of exports) is equal to:

$$m * (I - A)^{-1} * e / E \quad \text{where } E = \sum_{i=1}^n e_i \text{ (total exports)}$$

63. Similarly, the embodied imports in exports by industry j can be shown as:

$$\sum_i m_i * L_{ij} \quad \text{where: } L_{ij} \text{ is the } ij^{\text{th}} \text{ element of the Leontief inverse } (I - A)^{-1}.$$

64. In addition the share of imports used in the production process to produce exports is equal to:

$$m * (I - A)^{-1} * e / M \quad \text{where, } M = m * g \text{ (total imports)}$$

65. In the same way, one can estimate the total indirect and direct contribution of exports to value added by replacing the import vector m above with an equivalent vector that shows the ratio of value added to output (v). So, the contribution of exports to value added is equal to:

Contribution of domestic exports to value added = $V*(I-A)^{-1}*e$ and

The value added content of domestic exports = $V*(I-A)^{-1}*e/E$ and

The share of value added embodied within domestic exports = $V*(I-A)^{-1}*e/V$, where V = total value added

66. The formulas above demonstrate how to compute several relevant indicators that are not listed as indicators in Box 5.1. They are provided as potentially additional indicators to be included in analysing globalisation in countries' economies.

5.3.2. *Measuring trade involving MNEs: global and intra-firm trade*

67. Given their international orientation, MNEs are expected to account for a sizeable share of cross-border trade flows. Available data confirm that the shares of foreign-CAs in host-country exports and imports tend to be much larger than their shares in other measures of economic activity (such as host-country sales, value added, or employment).⁴ Some of this trade may represent flows of intermediate inputs from parent companies to foreign manufacturing affiliates, which in turn may export part of their output either back to the investing country or to regional markets. Trade by multinational firms may also take the form of cross-border shipments to wholesale trade affiliates that are set up to market the products of their parent companies.

5.3.2.1. *Conceptual framework*

68. From the perspective of an individual compiling country, trade flows that involve multinational firms consist of (1) the exports and imports of foreign-CAs located in the compiling country, and (2) exports and imports associated with domestically located parent companies and their CAs abroad.⁵ The trade flows of foreign-CAs include both intra-firm trade (i.e., trade with the CAs' foreign parent group and trade with unrelated firms. Trade flows associated with parent companies in the compiling economy and their CAs abroad include intra-firm trade between the parents and their CAs abroad, trade between the parent companies and other foreign firms (including both associates and unaffiliated firms), and trade between the CAs abroad and unaffiliated firms located in the compiling country.

5.3.2.2. *Trade by foreign-CAs*

69. Tables 5.1 and 5.2 present a breakdown of trade flows by foreign-CAs according to the affiliates' ownership ties with their foreign trading partners. For a given CA, the primary distinction is between trade with the CA's foreign parent group⁶ and trade with other foreigners. For a compiling country, trade between foreign-CAs and their foreign parent groups constitutes intra-firm trade associated with foreign MNEs' activity in the country.

70. In the breakdown shown in Tables 5.1 and 5.2, a CA's trade with other foreigners includes trade with the foreign affiliates it may have, as well as trade with unaffiliated foreign enterprises. Any trade between the foreign-CA and its own affiliates abroad constitutes a portion of intra-firm trade associated with the compiling country's direct investment abroad.

Table 5.1. **Exports by foreign-CAs in the compiling country**

Total	To the foreign parent group	To other foreigners		
		Total	To foreign affiliates	To unaffiliated foreigners
(1)	(2)	(3)	(4)	(5)

Table 5.2. **Imports by foreign CAs in the compiling country**

Total	From the foreign parent group	From other foreigners		
		Total	From foreign affiliates	From unaffiliated foreign enterprises
(1)	(2)	(3)	(4)	(5)

5.3.2.3. *Trade associated with parent companies and their CAs abroad*

71. A breakdown of trade flows by parent companies according to their ownership ties with foreign trading partners is shown in Tables 5.3 and 5.4. For a given parent company, a major break is between trade with its CAs abroad and trade with other foreigners. Trade between the parent companies and their CAs abroad typically will constitute the major portion of intra-firm trade associated with parent companies and their CAs abroad. Trade with other foreigners includes trade with associates abroad, which is also regarded as intra-firm trade, as well as trade with unaffiliated foreigners. If a given parent company in the compiling country is itself foreign-controlled, trade with other foreigners also includes trade with its foreign parent group, which constitutes a portion of intra-firm trade for foreign CAs.

72. A compiling country's trade with its CAs abroad includes both intra-firm trade between domestically located parent companies and their CAs abroad (Tables 5.3 and 5.4, column 2) and arm's-length trade between unaffiliated firms in the compiling country and the CAs abroad (Tables 5.3 and 5.4, column 7). It should be noted that arm's-length trade with the CAs of a given parent company may include exports or imports by firms that are parents of other CAs abroad.

Table 5.3. **Exports involving parent companies and their CAs abroad**

Total	Exports by parent companies in the compiling country					Exports by unaffiliated firms in the compiling country
	To their CAs abroad	To other foreigners				To affiliates controlled by compiling country parent companies abroad
		Total	To their foreign parent groups (if they are foreign-controlled)	To their associates abroad	To unaffiliated foreigners	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Table 5.4. **Imports involving parent companies and CAs abroad**

Total	Imports by parent companies in the compiling country					Imports by unaffiliated firms in the compiling country
	From their CAs abroad	From other foreigners				From affiliates abroad controlled by compiling country parent companies
		Total	From their foreign parent groups (if they are foreign-controlled)	From their associates abroad	From unaffiliated foreigners	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

5.3.2.4. *Main limitations of data collection and their interpretation*

a) *Potential duplication in recorded trade flows*

73. In a compiling country's surveys of MNEs operations, a foreign-CA that has its own CAs abroad may be counted both as a foreign-CA (in a survey on inward investment) and as a parent company of CAs abroad (in a separate survey on outward investment). There thus exists the potential for some duplication between data collected on the trade of foreign-CAs and data collected on the trade of parent companies.

74. The areas in which there could be potential duplication of intra-firm trade flows are shown in Tables 5.1, 5.2, 5.3 and 5.4. As a comparison of the tables reveals, data collected on trade between foreign-CAs and their affiliates abroad (Tables 5.1 and 5.2, column 4) could partly duplicate data on the intra-firm trade of parent companies in compiling countries (Tables 5.3 and 5.4, columns 2 and 5). Similarly, data on trade between parent companies and their foreign parent groups (Tables 5.3 and 5.4,

column 4) will duplicate part of the data on trade between foreign-CAs and their foreign parent groups (Tables 5.1 and 5.2, column 2).

75. For arm's-length trade, part of the data on trade by foreign-CAs with unaffiliated foreigners (Tables 5.1 and 5.2, column 7) may duplicate a portion of the data on trade by parent companies with unaffiliated foreigners (Tables 5.3 and 5.4, column 6). In contrast to the data involving intra-firm transactions, the degree of duplication in this data between foreign-CAs and parent companies cannot be identified precisely based on the breakdowns in the tables.

76. Apart from any duplication that may result from a company in the compiling country being counted both as a foreign-CA and as a parent company, data collected on trade between CAs abroad and unaffiliated firms in the compiling country (Tables 5.3 and 5.4, column 7) may include trade with parent companies of other CAs (Tables 5.3 and 5.4, column 6), as well as trade with foreign-CAs (Tables 5.1 and 5.2, column 4). Thus, a broad measure of MNE trade constructed by summing the trade flows associated with parent companies and foreign-CAs could involve some duplication.

b) Intra-firm trade

77. It is useful to compare intra-firm trade (total and by sector) with the total trade of affiliates under foreign control and parent companies. At the same time, given the size of intra-firm trade, one has to be able to compare the weight of that trade in a country's overall trade and, if possible, by geographical area. Data on total trade have to be collected in the surveys of the activity of MNEs in order to ensure the necessary comparability between the two categories of data. Data must be collected in international classifications such as ISIC Rev 3.

5.3.2.5. Transfer pricing

78. "Transfer prices" are defined as the prices used for internal exchanges and transactions between parent companies and affiliates belong to the same group located, in principle, in different countries. But they may also apply to transactions between parent companies and affiliates located in the same country.⁷ Valuations implicit in such prices are needed to comply with various legal requirements of the different countries in areas such as customs clearance, tax and financial reporting. However, how transfer pricing affects aggregate trade data and what compilers might do to take it into account is not totally clear

79. The prices used for this valuation will not always be the same as market prices which, indeed, may not exist. Although customs, tax or other regulations may seek to impose an arm's length standard for intra-firm transfers, where products or services traded within a firm have unique attributes, market prices may not exist. Even when they do, it would not be easy for the authorities to monitor compliance with the arm's length standard. Parent companies who decide this valuation may decide the prices of goods and services supplied to their affiliates in the light of circumstances, most importantly as regards their impact on tax liabilities. For example, in countries where profits are highly taxed, transfer prices on imported inputs may be increased so that declared profits will be reduced, while in countries where taxes are lower, such transfer prices may be reduced so that the level of profits declared will be comparatively high.

80. Transactions requiring transfer prices include those involving goods, services and intangibles (essentially property rights and other items of technology trade). Given that such prices do not correspond systematically to market prices, as would be established for transactions between unrelated parties, their valuation will not normally be on the same basis as that of other international transactions.

81. Since the major practical issues raised by transfer pricing concern taxation, tax authorities have devoted considerable attention to the question of what principles should be applied to the determination of transfer prices. To best achieve an equitable distribution of taxation across countries in which a group

operates and, at the same time, to minimise the risk of unrelieved double taxation, OECD Member countries have chosen to treat each enterprise within a group as a separate entity and have adopted an “*arm's length principle*” for pricing transactions between these entities (see Annex 5.1). The arm's length principle, *i.e.*, that pricing should be based on what would have occurred had the transacting entities been unrelated, would put the valuation of intra-firm trade flows on the same basis as that of other trade flows if it could always be applied accurately. However, there is often limited or no basis for such a valuation so in practice an element of arbitrariness in the valuation of intra-firm trade is unavoidable. Unfortunately, there is little that statistical compilers can do about transfer pricing. So users must interpret intra-firm trade data cautiously in light of these considerations.

5.3.2.6. *Recommendations for data collection*

82. Historically, detailed data on international trade flows have been available mainly for trade in goods, which is routinely reported in customs declarations. Data on trade in services, which generally must be collected in surveys, tend to be much less detailed. In addition, for intra-firm trade in services, companies may have particular difficulties in reporting the types of services involved. A variety of services may be performed at company headquarters on behalf of the entire MNE and the associated expenses allocated worldwide, without a precise breakdown of the specific types of services provided to each CA. Because of these practical limitations, it is recommended that the initial data collection efforts for trade involving MNEs focus primarily on trade in goods.

83. For compiling countries, it is recommended that first priority be given to the collection of data on total exports and imports of goods by foreign-CAs. In conjunction with national data on trade in goods collected from customs declarations, these data can be used to determine the share of foreign-CAs in the country's total exports and imports of goods, one of the reference indicators listed in section 5.2.2 of this chapter.

84. Data on exports and imports of goods by foreign-CAs can be collected through national surveys of the operations of foreign-CAs (which can also provide data for a number of the reference indicators discussed in Chapter 3). As an alternative to conducting separate surveys for foreign-CAs, it may be possible to identify foreign-CAs exports and imports through the inclusion of a foreign-control identifier either in national business registers or in the customs documents used to collect data on trade in goods.

85. In collecting these data, an effort should be made to identify the trade in goods between the foreign-CAs and their foreign parent groups.⁸ The share of intra-firm trade in the compiling country's total exports and imports of goods – one of the reference indicators listed in section 5.2.2 – reveals the degree to which cross-border flows of goods take the form of internal transactions within foreign MNEs. Another measure that can be constructed is the share of this intra-firm trade in the total exports and imports of goods by foreign-CAs; this measure reveals the extent to which these enterprises rely on their parent group abroad as a market for their exported output and as a source for their imported intermediate inputs, or for other products distributed to host countries. Other analytically useful measures can be constructed by taking the ratios of foreign-CA total or intra-firm exports and imports to their gross output or sales (two of the variables discussed in Chapter 3). In analyzing these measures, it would be useful to examine their variation by industry and by country of control.

86. For trade data collected through surveys of affiliate operations, it is desirable to present the data by primary industry of the CA. Particular priority should be given to providing breakdowns for trade by CA in manufacturing (which relates to the production of goods by CAs) versus trade by CAs in wholesale trade (which relates to distribution and marketing activities by CAs). Industry detail within manufacturing is also desirable for analysis. In some cases, it may be useful to compare data on CAs exports and imports by manufacturing industry with national totals on exports and imports of goods concorded by industry (on

the basis of the industry that produces the goods); however, such comparisons should be made with caution. In particular, the ratio of exports or imports by foreign-CAs in a given manufacturing industry to the national total for exports or imports of goods produced by that industry should not be interpreted as a precise share. For one thing, some of the goods produced in a given industry may be exported or imported by CAs in industries outside of manufacturing (such as wholesale trade). In addition, for imports, the goods imported by CAs classified in a particular industry need not be goods produced by that industry.

87. It is also desirable to present data on the exports and imports of foreign-CAs by country of the controlling owner - information which is generally included in data collected through surveys of affiliate operations. For foreign-CAs, the preferred ownership concept is that of the ultimate controller. It should be made clear that the country of ultimate control is not necessarily equivalent to the country of destination for CA exports or the country of origin for CA imports.

88. Geographic breakdowns of foreign-CAs exports by country of destination and imports by country of origin would be very useful for analysis; however, such detail may be difficult to collect in surveys of affiliate operations. Information of the on the geographic destination of affiliate exports and the geographic origin of affiliate imports might be more readily available from national customs data that are tagged to identify trade flows associated with foreign ownership.

89. Product-level data on the exports and imports by foreign-CAs are also analytically useful, and can easily be combined with comparable national data to compute foreign-CAs' shares by product group. Detailed product data may be difficult to collect in surveys of affiliate operations, but should be readily available from national customs data that are tagged to identify trade flows associated with intra-firm trade.

90. Another breakdown that would be informative but may be difficult to collect concerns the intended use of imports by foreign-CAs. In this breakdown, total and intra-firm imports by foreign CAs are distinguished according to whether they are intended to serve as intermediate inputs for further manufacture by the CAs, as capital goods added to the CAs's plant and equipment, or as marketed goods to be resold by the CAs without further manufacture. Data on imports intended for further manufacture by the CAs are particularly useful for research concerned with the international fragmentation of production between different units of MNEs.

91. Turning to trade flows associated with the compiling country's MNEs, it is recommended that priority be given to the collection of data on total exports and imports of goods by parent companies located in the compiling country. In conjunction with national data on trade in goods collected from customs declarations, these data can be used to determine the share of parent companies in the country's total exports and imports of goods, one of the reference indicators listed in section 5.2.2 of this chapter.

92. As with the data on trade by foreign-CAs, data on exports and imports of goods by parent companies can be collected either through specially designed surveys of the operations of parent companies and their CAs abroad or through the inclusion of a parent-company identifier in national business registers or customs documents. For trade data collected in surveys, it is desirable to present the data by primary industry of parent and by country of destination or origin.

93. Compiling countries that conduct surveys on the operations of parent companies and their CAs abroad are encouraged to present data on intra-firm trade in goods between parent companies and their CAs abroad. In conjunction with national data on trade in goods collected from customs declarations, these data can be used to determine the share of this intra-firm trade in the country's total exports and imports of goods, a supplemental indicator listed in section 5.2.3 of this chapter.

Box 5.3. Recommendations for measuring trade involving MNEs

Priority should be given to the following measures:

- i) For *inward investment*, total exports and imports of goods by foreign-CAs (column 1 of Tables 5.1 and 5.2) and intra-firm flows of goods between foreign-CAs and their foreign parent groups (column 2 of Tables 5.1 and 5.2).
- ii) For *outward investment*, total exports and imports of goods by parent companies (column 1 of Tables 5.3 and 5.4).

5.3.3. *Measuring trade in intermediate goods*

94. There are several ways of measuring the importance of the international division of production processes, and for identifying trade in intermediate products.

- i) Business surveys are the most fertile source of information. Because they allow for the microeconomic pinpointing of flows, the precise identification of the destination and nature of products (same-state resale, further processing, etc.), and cross-referencing with databases on such variables as value added, profitability or innovation, they are an ideal research tool. Yet, owing to their cost and complexity, such surveys exist only for a limited number of countries (e.g. the United States, Japan and France), they are not regularly updated, and their methodologies are generally not compatible, making comparisons between countries difficult.
- ii) Input-output tables offer a symmetrical solution. They involve working with broad industries (and grouping portions of firms rather than firms) and they show the extent to which industries use outside inputs. A portion of these relationships passes through international trade. The international division of the production process can be identified by the (intermediate) use of the goods traded. This method has the advantage of using reliable calculation principles and relatively well-stocked databases. However, the tables are updated only at intervals of several years, they are generally published with a considerable time lag, and the data are available only at fairly highly aggregated levels, both in sectoral and geographic terms. Also, for many countries, the use of input-output tables is subject to the limitation that is necessary to estimate imported intermediate inputs for a given industry indirectly by applying an economy-wide share of imports in the supply of a given good for each good used as an intermediate input in the industry.

95. Another approach is to take into account the final use of products. The United Nations Broad Economic Categories Classification makes it possible to group products from the Standard International Trade Classification (SITC) according to their nature (primary or processed product) or in terms of their final use (intermediate goods, capital goods or consumer goods).⁹ However, in order to apply this method, additional information is needed. This last classification is defined in terms of products. It has the advantage of classifying each product both *by stage of production and by industry*. This is important, for example, when it comes to distinguishing the degree to which the apparent specialisation in final products is based on prior imports of intermediate goods from the same industry.

Box 5.4. Trade in intermediate goods within the international division of production processes

The internationalisation of production is a fundamental aspect of business strategies, and a key feature of economic globalisation. With their ties to their home country becoming increasingly tenuous, firms are supplying a global market by expanding their location choices. At the same time, the flow of foreign direct investment, strategic alliances and international subcontracting agreements allow for the increasingly refined specialisation of production units. The "international division of production processes" reflects the reorganisation of firms' value added chain on a regional and even world-wide basis. This is a specific form of the international division of labour, which is swiftly replacing older forms of internationalisation that were based on importing raw materials and exporting finished goods. It makes itself felt in the exchange of intermediate goods and thus has a direct influence on the volume and nature of international trade. International trade in intermediate goods implies an increasing degree of interlocking between countries' productive apparatus and poses some specific challenges.

The importance of economies of scale, which lead to ever smaller numbers of increasingly specialised production units, and the need to standardise processes upstream, while differentiating downstream in order to meet consumer demands for variety or quality, have combined to impose new ways of articulating products and production processes.

With technological progress and market globalisation, it is now possible to break up the production process of a given good into an increasing number of successive, upstream-downstream stages, and to increase in this way the number of intermediate goods that enter into the manufacturing process. Upstream goods (often highly standardised) are produced on a large scale by highly specialised plants (which may be located in different countries) and these are then combined or assembled in various ways, downstream, to create a broad range of widely differentiated varieties, closely adapted to specific markets.

Exports within an industry are often dependent in part on imports of goods produced by the same industry. Intra-industry trade measured at the less-detailed sector level thus comes in part from the international division of the production process. The "intra-firm trade" of multinational firms, which is a particular form of this division of labour, is thus associated by some economists with "intra-industry" trade. For example, they may point to differences in production and marketing costs between the parent corporation and its affiliates abroad:¹⁰ a strategy of cost minimisation will lead a multinational firm to produce a single variety in a single country (through an affiliate), and sell it in other countries, while acting in symmetrical fashion with other varieties, thereby generating export and import flows within the same industry.¹¹

The empirical link between these two theoretically distinct concepts – intra-firm and intra-industry – depends on the degree of detail in the classification nomenclature used. Take for example the case where a parent company sells components to an affiliate abroad for assembly, and then purchases the final product from that affiliate. The fact that a firm is focusing its efforts on R&D and on the manufacture of sophisticated components, while performing the (unskilled) labour-intensive work of assembling those components through an affiliate abroad (where labour costs are lower) certainly constitutes a form of intra-firm trade, but it should not necessarily be interpreted as "intra-industry" trade (which is based on substitutable products). It reflects in effect an international division of production processes within a multinational firm.¹² Note, finally, that this division of labour is not limited to exchanges within industries or firms, but can also take place between industries and firms.

5.3.4. *Measuring intra-regional and extra-regional trade*

96. Regional free trade agreements and increasing regional economic integration have increased the importance of intra-regional trade flows. These can be measured in terms of: 1) the overall structure of and trends in intra-regional trade and 2) the nature of the products traded, whether goods or services. The first set can be used primarily with regard to manufacturing and non-manufactured goods rather than services. It is also still not possible to make a simple distinction between goods and services for intra-regional trade.

97. *Intra-regional* exports and imports relate to flows between each individual country in the region and all the others. *Extra-regional* trade (exports and imports) is equal to flows between all the countries in the region and the rest of the world, less intra-regional flows. The more countries become an integral part of a region, the more intra-regional trade will exceed extra-regional trade in importance. This could raise certain questions concerning trade policy, for example when countries belonging to a free-trade area cease

trading or trade very little with countries that are not members. These indicators can measure to what extent the multiplication of free-trade agreements influences world trade. Countries belonging to a free-trade area could thus be likened to one country, allowing its market shares in world exports to be measured.

98. In the case of multinationals, an additional difficulty is that flows of manufacturing trade and flows of services are mixed together, since a firms' entire trade is assigned to its main activity. The United States is probably the only country that collects data on multinationals' trade separately for goods and for services. The same distinction is made for data on the sales of affiliates, irrespective of the industries to which they belong. In contrast, for the total trade of all firms, other distinctions can be drawn exclusively for manufactured goods, especially for intermediate and finished goods, customs data by product. This information can tell us, for example, whether intra-regional trade concerns finished rather than intermediate goods, in which case it would be useful to check whether extra-regional trade in intermediate goods is with affiliates belonging to countries in the area, or with unaffiliated firms.

Box 5.5. Recommendations for measuring intra- and extra-regional trade

In order to construct the proposed indicators in Box 5.7, countries which belong to a free trade region are invited to measure:

- Intra-regional trade of goods excluding it systematically from the global trade of these regions with the rest of the world (see Box 5.6). This implies the availability of data on the bilateral trade flows of each country with all the other countries of the same region.
- In the future, countries are invited to develop two categories of indicators:
 - a) Intra and extra-regional trade flows of manufacturing products concerning multinational firms (parent companies and foreign affiliates) located inside each region.
 - b) Global trade as well as intra- and extra-regional trade on services concerning multinational enterprises (see MSITS).

99. Another distinction is that between intra-industry and inter-industry goods. A final distinction relates to the technology content of trade (high, medium, low). All these distinctions can tell us something about specialisation within the region or free trade area, as well as corporate organisation between the various countries of the area and the import dependency in each category of goods. Box 5.6 explains how to calculate the main indicators of intra- and extra-regional trade and Box 5.7 summarises the various indicators proposed and their availability.

Box 5.6. Measuring intra- and extra-regional trade

The increase in the number of regional free-trade agreements is creating a new statistical need for trade indicators to take the regions concerned into account as a geographic whole. The two basic indicators to be constructed are intra-regional and extra-regional trade.

Intra-regional trade

Let it be assumed that a free trade area comprises n countries. The exports of the countries within that region is the sum of exports of each country to all the other countries in the region. Thus:

$$X_{int\ ra}^n = \sum_{i=1}^n \sum_{j=1}^{n-1} X_i^j \quad \text{where}$$

$X_{int\ ra}^n$ = the value of intra-regional exports of the n countries of the region;

X_i^j = the value of exports of country i of the region to the other countries j (with $i \neq j$) of the region.

The same formula can also be used for imports.

Extra-regional trade

Extra-regional trade for exports would be the total exports of each of the region's countries to all the world's countries minus intra-regional trade. Thus:

$$X_{Extra}^n = \sum_{i=1}^n X_i^{World} - X_{int\ ra}^n \quad \text{where}$$

X_{Extra}^n = the value of extra-regional exports of the n countries of the region;

X_i^{World} = the value of exports of each of the region's countries to all the world's countries.

With these basic indicators it is possible to construct two other relevant indicators: the ratio of a free trade area's intra-regional trade to world trade, and the market share of that area.

Ratio of regional trade to world trade

The ratio to be calculated is:

$$X_{int\ ra}^n / X_{world}$$

This ratio may increase more during the initial phase following the free trade area's creation and subsequently stabilise if intra-regional exports grow at the same rate as world exports.

Export market share of a region

The indicator of export market share must treat the free trade area as if it were a single country. Then the indicator would be:

$$100 X_{Extra}^n / X_{world}$$

All of the above indicators can be calculated for the industrial sector as a whole (goods and services) and also for individual industries.

Box 5.7. Indicators of intra-regional trade

Indicators for free trade regions	Availability (OECD zone)		
	Available for all countries	Available for a few countries	Desirable but not available
<i>a) Structure of trade</i>			
– Intra-regional trade in goods as a percentage of extra-regional trade in goods	X		
– Intra-regional trade in services as a percentage of extra-regional trade in services		X	
– Trade in goods between free trade areas	X		
– Region's share of goods export markets	X		
– Share of intra-regional and extra-regional trade in global trade	X		
– Total trade by multinationals as a percentage of total trade		X	
<i>b) Nature of trade</i>			
– Trade in goods			
– Trade in services			
– Trade in intermediate goods			
– Trade in finished products			
– Trade in inter-industry goods			
– Trade in high, medium and low-technology goods*			

* See Chapter 4.

5.4. Guidelines for developing experimental trade indicators

5.4.1. *Calculating trade balances based on capital ownership*

100. Another measurement issue is preparing supplemental balance of payments accounts that better recognize the role of foreign affiliates as a means of delivering goods and services to international markets. In such accounts, “trade” is construed broadly to include not only cross-border exports and imports, but also deliveries through foreign affiliates. However, the latter are entered in the accounts, not at their full value, but in a way that reflects only the return to the capital ownership by the parent company. The trade balance is redefined to reflect both channels of delivery, thus capturing the effects on the compiling country of sales that originate both within and beyond its geographical borders.

101. The conventional measure of the trade balance reflects a country's performance in international markets in terms of the net value of goods and services transactions between firms and persons residing in that country and those residing abroad. Sales of goods and services by foreign affiliates of companies which have invested in other foreign persons, and sales by foreign affiliates in host countries to other persons in those countries, are not regarded as exports and imports and are therefore excluded from the trade balance.

102. In a framework based upon capital ownership, in contrast, sales by foreign affiliates are no longer disregarded, but are entered in the accounts in a way that reflects the return to the direct investor's ownership interest in the affiliate (which, in conventional balance of payments accounts, may be labelled “direct investment income”). Returns to investors in the compiling country generated by the sales of goods and services by their foreign affiliates are added to the conventional measure of cross-border exports, to yield a measure of the compiling country's total receipts arising from cross-border sales and sales by foreign affiliates. Similarly, returns accruing to the foreign owners of affiliates located in the compiling country are added to cross-border imports, to yield a comparable measure of the compiling country's total payments. Entering the effects of affiliate sales in this way recognizes these sales as a separate and distinct method of supplying foreign markets, while at the same time ensuring that only the portion of the sales that accrues to the benefit of the home country is included as revenue from that country's foreign sales. The grouping of these items recognizes that cross-border trade and sales through affiliates both are methods of active participation in international markets. In this regard, they lie in sharp contrast with other items in the current account, including the more passively generated income on portfolio investment and the fundamentally different types of transactions recorded under current transfers.

103. To show the linkages between the returns generated by direct investors and the activities of affiliates that generate these returns, if the necessary data are available, details may be added showing the gross sales and expenses (as well as any profits accruing to local or third-country investors) that, when netted against one another, give rise to this return. (As a practical matter, it may be difficult to collect information on expenses directly, in which case expenses may be estimated residually, as the difference between the return to direct investors and the sales that generate the return.) Again depending on data availability, expenses could be further broken down to show major items of interest, such as compensation of employees, thus providing a more detailed picture of the activities generating and underlying the return to direct investors.

104. Having constructed these more comprehensive measures of receipts and payments resulting from international sales and purchases, a balance is calculated equal to the difference between them.

105. Accounts compiled on this basis have been presented periodically in the United States since the early 1990's. The basic structure of the accounts and key figures for the year 2000 are shown below in Table 5.5. In addition to the items discussed above, the table adds details on whether the cross-border

trade is with unrelated parties or with affiliated parties and, for the latter, on whether the trade is with foreign parent companies or with foreign affiliates. In the table, trade with affiliated parties is defined as all trade with enterprises having a direct investment relationship. In addition, net receipts of direct investment income and the underlying sales and expenses are derived using data for all affiliates, rather than only those affiliates that are foreign-controlled. These procedures help to maintain consistency between these accounts and the standard accounts that define direct investment relationships using a 10% ownership criterion, as recommended by BPM5 and BD3.¹³ They also help to avoid the inconsistency that would arise in the case of a minority-owned affiliate that is held indirectly, through a directly held controlled foreign affiliate; the direct investor's return from such an affiliate would be included in income from the controlled affiliate, but the minority-owned affiliate's sales and expenses would not be recorded because of the absence of foreign control.

106. Table 5.5 shows that, for the United States during 2000, the trade deficit calculated on the basis of capital ownership (line 37) was smaller than the deficit shown in the traditional accounts based on the location of production (line 36). This difference can be explained by the fact that receipts generated by US parent companies from sales by their affiliates abroad exceeded payments accruing to parent companies in other countries from sales by their affiliates in the United States.

107. Other methods of constructing supplemental accounts based on capital ownership have been suggested. For example, in the United States, a National Academy of Sciences (NAS)¹⁴ study panel proposed accounts that differ from those described above in two major ways. First, rather than deducting from the affiliate's sales *all* costs and profits other than the return to direct investors, these accounts would deduct only the cost of purchased intermediate inputs, leaving an amount equal to the affiliate's value added in production. Because value added may include a major component of locally incurred costs, such as for compensation of employees, this method may result in too gross an indicator for purposes of gauging the effect of changes in affiliates' sales on the economy of the investor (home) country. However, it may be more reflective than either the standard accounts or the accounts presented above of the way multinational firms view their worldwide operations. A second difference is that the NAS proposal redefines the boundary between "domestic" and "foreign" entities, in that firms are categorized as one or the other based on their ownership rather than their residency. In the case of foreign affiliates, for example, sales back to the home country are considered domestic-to-domestic transactions and are excluded, while sales in the country of location are regarded as international transactions that are to be included. By redefining this boundary, these accounts are not so much a satellite of the conventional accounts, but rather a different type of account, which may serve a different purpose.

108. Still another proposal was made by DeAnne Julius,¹⁵ writing in 1990 for the Council on Foreign Relations. As with the NAS proposal, she suggested assigning nationality to firms based on ownership rather than residency, but she netted out *all* payments by affiliates to foreigners rather than only their expenses for intermediate inputs. Furthermore, she considered these payments as imports of the home country rather than as a deduction from affiliates' sales. While this approach represents a fundamental restructuring of the accounts, the fact that all of the affiliate's payments to foreigners – both those for factor services (labour and capital) and those for intermediate inputs – are recorded as trade results in balances identical to those derived under the accounts described above and presented in Table 5.5.

Table 5.5. Ownership-Based Framework of the U.S. Current Account, 2000

Billions of dollars

1	Exports of goods and services and income receipts	1 417.2
2	Receipts resulting from exports of goods and services or sales by foreign affiliates	1 213.9
3	Exports of goods and services, total	1 064.2
4	To unaffiliated foreigners	736.5
5	To affiliated foreigners	327.7
6	To foreign affiliates of U.S. companies	247.4
7	To foreign parent groups of U.S. affiliates	80.3
8	Net receipts by U.S. companies of direct investment income resulting from sales by their foreign affiliates	149.7
9	Nonbank affiliates	147.9
10	Sales by foreign affiliates	2 891.5
11	Less: Foreign affiliates' purchases of goods and services from the United States	247.4
12	Less: Costs and profits accruing to foreign persons	1 971.1
13	Compensation of employees of foreign affiliates	302.6
14	Other	1 668.5
15	Less: Sales by foreign affiliates to other foreign affiliates of the same parent	525.1
16	Bank affiliates ¹	1.8
17	Other income receipts	203.3
18	Imports of goods and services and income payments	1 774.1
19	Payments resulting from imports of goods and services or sales by U.S. affiliates	1 503.7
20	Imports of goods and services, total	1 442.9
21	From unaffiliated foreigners	952.4
22	From affiliated foreigners	490.5
23	From foreign affiliates of U.S. companies	195.4
24	From foreign parent groups of U.S. affiliates	295.1
25	Net payments to foreign parents of direct investment income resulting from sales by their U.S. affiliates	60.8
26	Nonbank affiliates	56.9
27	Sales by U.S. affiliates	2 334.7
28	Less: U.S. affiliates' purchases of goods and services from abroad	389.4
29	Less: Costs and profits accruing to U.S. persons	1 888.4
30	Compensation of employees of U.S. affiliates	329.7
31	Other	1 558.7
32	Less: Sales by U.S. affiliates to other U.S. affiliates of the same parent ²	n.a.
33	Bank affiliates ¹	3.9
34	Other income payments	270.4
35	Unilateral current transfers, net	-53.4
	Memoranda:	
36	Balance on goods and services	-378.7
37	Balance on goods, services, and net receipts from sales by affiliates (line 2 minus line 19)	-289.8
38	Balance on current account	-410.3

1. Details on underlying sales and expenses are not available for bank affiliates.

2. Not available but, because affiliates are required to report on a consolidated basis, probably immaterial.

Box 5.8. Recommendations on calculating trade balances based on capital ownership

Countries that wish to do the foregoing calculations for their own case will need to collect data on:

- Local procurement of goods and services by foreign affiliates located in their country, from all countries save their own.
- Local procurement of goods and services by foreign affiliates located in their country.

5.4.2. *Measuring international subcontracting*

Main features

109. Globalisation has stiffened competition, thereby driving firms to produce better, faster and more cheaply. To do so, many firms have had to sharpen their focus and devote themselves exclusively to the activities that constitute the core of their business. A typical approach is to outsource other work through subcontracting.

110. A firm that subcontracts work abroad does so in order to devote its time and human resources to those areas where it has a competitive advantage over other firms. Subcontracting also allows a firm to take advantage of highly-targeted know-how that is only available outside the firm, and often beyond national frontiers. In the latter case we speak of international subcontracting. Increasingly, subcontracting firms have become specialised businesses with capabilities that are much in demand.

111. One effect of such specialisation in any given line of business is “multi-tier subcontracting”. The buying firm (the “principal”) engages a first-tier subcontractor, who in turn will arrange with a second-tier or even a third-tier subcontractor to do some portion of the work that falls beyond its own field of expertise.

112. The principal kinds of subcontracting are “*structural subcontracting*”, where a firm's strategy leads it to call upon the capabilities of companies outside its own group and leads to a regular, ongoing relationship, and *occasional or ad hoc subcontracting* may occur where a firm engages another business on a temporary basis to supply goods or services that it would normally produce itself but cannot do so at the moment, within the deadlines imposed by the order it must fill.

Box 5.9. Subcontracting defined
Subcontracting (broad meaning)

Subcontracting occurs when one firm, the prime manufacturer or contractor (“principal”), contracts with another firm, the subcontractor or “supplier”, for a given production cycle, one or more aspects of product design, processing or manufacture, or construction or maintenance work.

The output is generally incorporated into the principal's final products. Subcontracting can also involve services, particularly studies, accounting, engineering, R&D, advertising, computer services or legal advice. Most of these services are of the kind that can be subcontracted abroad (international subcontracting).

The “supplying” firm must adhere strictly to the “principal's” technical or commercial specifications for the products or services in question.

113. An important distinction needs to be made between subcontracting and co-operative arrangements or partnerships. To appreciate this difference it is useful to distinguish two categories of subcontracting. The *first* involves relatively commonplace, “low-tech” goods and services, such as catering, cleaning, transportation, accounting services, intermediate inputs for various kinds of machinery, etc.. The *second* category concerns goods and services that have a high technological content and are subject to constant innovation.

114. The relationship between the principal and the supplier will differ between the two categories. In the first category the principal, having a broader range of choice, can often exert heavy pressure on prices and deadlines and is able to replace subcontractors with relative ease.

115. On the other hand, suppliers of the second category are more closely involved in the design of the product or service, and they in effect assume the role of a partner. This type of subcontracting may be called a “*subcontracting partnership*”.

116. A typical example of this type of subcontracting is the relationship that exists between automobile makers or aircraft manufacturers and their respective equipment suppliers (landing gear, instrument panels).

117. Both cases generally involve high-tech goods where the suppliers must do more than simply fulfil an order. They must also participate in designing products and monitoring technological trends, and may even impose certain innovations on their prime contractors. The latter are in fact much more dependent on their subcontractors than are first category principals. Nevertheless, such arrangements cannot generally be regarded as co-operation agreements.

118. In co-operation agreements, the partners often establish reciprocal financial ties (through cross-shareholding arrangements) and may undertake to share costs and risks or to pool their efforts to develop a new technology.

Main indicators

119. A central feature of subcontracting is that the same firm can engage subcontractors abroad, while simultaneously acting as a supplier under subcontract to other businesses. Indicators must take due account of this dual aspect.

120. A first category of indicators could cover subcontracting of the kind where the principals are domestic firms of a given country, while a second category could relate to subcontracts where the principals are foreign firms and the subcontractors are domestic firms of that country. Amongst a given country’s domestic firms, a distinction needs to be made between resident-controlled enterprises and foreign-CAs in the same country. In principle, transactions between affiliates, whether under resident or foreign control, should not be treated as subcontracting activity. These transactions are covered by the indicators of multinationals’ activity and intra-firm trade in particular. From this point of view, international subcontracting should be regarded as an alternative to direct investment. Resident-controlled firms can be order givers or takers with non-affiliated firms abroad, while their foreign-CAs can be order givers or takers with independent firms abroad.

Box 5.10. Main indicators of international subcontracting

Indicators	Availability		
	Available in most countries	Available in some countries	Desirable but not available
1. Firms placing the order are firms controlled by the residents of country A			
• Manufacturing orders placed abroad by firms controlled by the residents of country A, by sector:			
– With non-affiliated firms.			X
• Service orders placed abroad by these firms, by sector:			
– With non-affiliated firms.			X
– With other institutions (universities, public labs, etc.).			X
• Manufacturing orders placed abroad by foreign-CAs of country A, by sector:			
– With non-affiliated firms.			X
• Service orders placed abroad by foreign-CAs of country A, by sector:			
– With non-affiliated firms.			X
– With other institutions (universities, public labs, etc.).			X
• The same indicators, by country of destination.			X
2. Firms placing the order are foreign firms approaching country A			
• Manufacturing orders received from abroad by firms controlled by the residents of country A, by sector:			
– With non-affiliated firms.			X
• Service orders received from abroad by firms controlled by the residents of country A, by sector:			
– From non-affiliated firms.			X
• Manufacturing orders received from abroad by foreign-CAs of country A, by sector:			
– From non-affiliated firms.			X
• Service orders received from abroad by foreign-CAs of country A, by sector:			
– From non-affiliated firms.			X
• The same indicators, by country of origin.			X
3. Ratios*			
• Ratio of international subcontracting to domestic subcontracting.			X
• Ratio of orders placed abroad to total imports.			X
• Ratio of orders received from abroad to total exports.			X

* These ratios can be calculated for all firms, and separately for domestic and foreign firms, as well as by sector and by country of destination or origin.

121. Another useful distinction concerns subcontracting for manufactured goods vs. services, and it applies equally to firms classified either as manufacturing or service businesses. The specific question is whether a firm that is primarily engaged in a manufacturing sector outsources a portion both of its manufacturing goods and of its services (the reverse situation is far less common). When it comes to subcontracting for services abroad, it is useful to note that this can be done not only with businesses but also with universities and other public or private institutions.

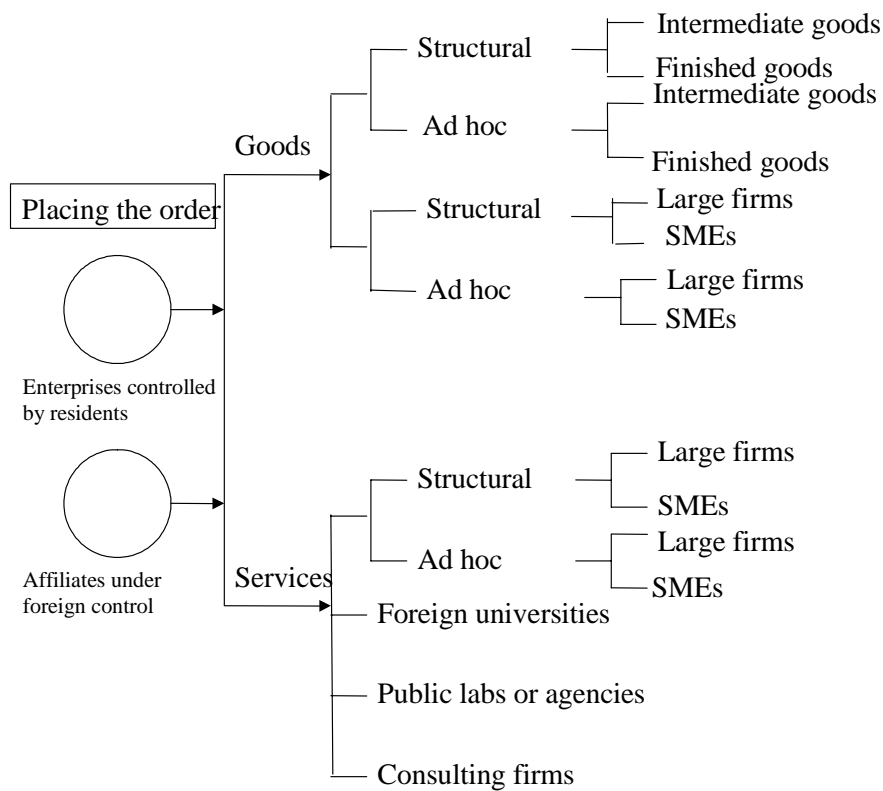
122. It is also interesting to determine whether such subcontracting is of a structural or ad hoc nature.

123. Other distinctions relate to the nature of the products and the characteristics of the firms involved. Thus, products may be intermediate or finished goods, while the firms involved may be large companies or SMEs. In fact, SMEs are often involved in “subcontracting partnership” arrangements.

124. French surveys have shown that the smaller an SME, the more likely it is to be involved in such arrangements. At the same time, SMEs are highly dependent on the least elaborate and most conventional form of subcontracting.

125. Figure 5.3 offers a typology of the different forms of international subcontracting.

Figure 5.3. **International subcontracting typology of a compiling country**



126. By contrast, Box 5.10 which summarises the major indicators required, does not cover all the aspects and forms shown in Figure 5.3.

127. What is needed is to collect data by sector and by country of destination and origin for the two subcontracting categories discussed above, while distinguishing between domestic firms and foreign-controlled firms.

128. These indicators would appear to be very limited in their availability at both the domestic and international level. One of the major difficulties here is that many countries do not systematically collect the detailed domestic data needed for these indicators, while the underlying concepts need to be better harmonised.

5.4.3. *Intra-industry trade*

129. Different types of trade are captured in measurements of intra-industry trade: a) “horizontal trade” in similar products with differentiated varieties (e.g. cars of a similar class and price range); b) trade in “vertically differentiated” products distinguished by quality and price (e.g. Italy exports high-quality clothing and imports lower-quality clothing). Horizontal intra-industry trade enables countries with similar factor endowments to benefit from economies of scale by specialising in “niche” products. Trade in vertically differentiated products may reflect different factor endowments, particular skills of the workforce or high fixed research and development costs. Vertical specialisation, for example, to use cheap unskilled labour for assembly purposes or specialised personnel for research and development.

130. Whatever indicator of intra-industry trade is selected (see Box 5.11), it is generally accepted that intra-industry trade is in part a statistical illusion. In fact, many empirical studies of intra-industry trade suffer from a geographic or sectoral aggregation bias:

- A geographic bias appears when different partners within a given country are pre-grouped for calculation purposes.¹⁶
- The empirical detection of intra-industry trade is closely linked to the level of sectoral aggregation used for calculation: the more products that are in fact different (in terms of factor or technology content) are grouped together under the same heading (industry, branch), the greater is the risk of significant overlap between exports and imports, and hence the appearance of “intra-industry” trade relating to heterogeneous products.

131. On this point, there is no consensus among economists as to the appropriate sectoral level. While some economists (such as Balassa and Lloyd) recognise the problem of heterogeneous products within an industry, the problem cannot be resolved by disaggregating too far, because this will separate goods that may in fact be substitutes. As others see it, the most detailed level possible must be used, because the sectoral level selected for calculation affects not only the measure of intra-industry trade (and its importance compared to inter-industry trade), but also its interpretation.

Box 5.11. The measurement of intra-industry trade

Intra-industry trade flows are conventionally defined as the two-way exchange of goods within standard industrial classifications. The extent of intra-industry trade is commonly measured by Grubel-Lloyd indexes based on commodity group transactions. Thus, for any particular product class i , an index of the extent of intra-industry trade in the product class i between countries A and B is given by the following ratio:

$$IIT_{i,AB} = \left(\frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)} \right) \cdot 100 \quad [1]$$

This index takes the minimum value of zero when there are no products in the same class that are both imported and exported, and the maximum value of 100 when all trade is intra-industry (in this case X_i is equal to M_i). Bilateral indices of intra-industry trade in the product class i between country A and all its trading partners are obtained as a weighted average of the bilateral indices [1] for each partner country B, using as weights the share of total trade of A accounted for by trade with B. Bilateral indices of intra-industry trade between country A and country B for total manufacturing are the weighted average of the indexes in [1] for all product classes i , with weights given by the share of total trade of i over total manufacturing trade:

$$IIT_{AB} = \sum_i \left(\frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)} \right) \cdot \left(\frac{(X_i + M_i)}{\sum_i (X_i + M_i)} \right) \cdot 100 \quad [2]$$

A degree of caution must be used when comparing and interpreting intra-industry indices because their measurement crucially depends on the level of disaggregation chosen for the analysis. In the current context of assessing the importance of the division of the production process across countries, it should be recognised that, as well as measuring trade in intermediate goods at various stages of production, much intra-industry trade is trade in similar, but often highly differentiated, finished products.

Source: OECD Economic Outlook 71, June 2002, p. 160.

ANNEX 5.1.

ARM'S LENGTH PRINCIPLE

Box 1. Arm's length principle

When independent enterprises deal with each other, the conditions of their commercial and financial relations ordinarily are determined by market forces. When associated¹⁷ enterprises conduct transactions among themselves, their commercial and financial relationships are not necessarily subject to the same market influences. This sometimes provides scope for manipulating profits which may have tax advantages, especially since there may be a genuine difficulty in accurately determining a market price in the absence of market forces or when adopting a particular commercial strategy. It must be remembered that the need to make adjustments in order to approximate arm's length dealing arises regardless of any contractual obligation that parties may have accepted to pay a certain price, and whether or not they are deliberately attempting to minimise their tax burden. Thus, a finding of transfer pricing problems is not the same thing as a finding of fraud or tax evasion, even if transfer pricing policies are sometimes used for such purposes.

Transfer prices affect both the amount of tax payable by the associated enterprises and the tax receipts of the host country when they do not reflect the play of market mechanisms and the arm's length principle. OECD Member countries have agreed that, for taxation purposes, the profits of associated enterprises may be adjusted to ensure that the arm's length principle is respected.¹⁸

The arm's length principle is generally applied by comparing the conditions of the transaction between associated enterprises and those of a comparable transaction between comparable independent enterprises operating under comparable circumstances, thereby providing broad parity of tax treatment for MNEs and independent enterprises. The arm's length principle has also been found to work effectively in the vast majority of cases. Nevertheless, there are some significant cases in which the arm's length principle is difficult and complicated to apply, for example, in MNE groups dealing in the integrated production of highly specialised goods in unique intangibles, and/or in the provision of specialised services.

A practical difficulty in applying the arm's length principle is that associated enterprises may engage in transactions that independent enterprises would not undertake. Such transactions may not necessarily be motivated by tax avoidance but may occur because in transacting business with each other, members of an MNE group face different commercial circumstances than would independent enterprises. For example, an independent enterprise may not be willing to sell an intangible (e.g. the right to exploit the fruits of all future research) for a fixed price if the profit potential of the intangible cannot be adequately estimated and there are other means of exploiting the intangible.

In order to establish the degree of actual comparability and then to make appropriate adjustments to establish arm's length conditions (or a range thereof), it is necessary to compare attributes of the transactions or enterprises that would affect conditions in arm's length dealings.

The methods used for detecting whether the arm's length principle is applied are described in *OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administration* (OECD, 2001) where the following factors are identified for consideration:

The *specific characteristics* of the goods or services in question (for example, quality, reliability, form of transaction, type of asset or expected advantage, etc.).

Functional aspects (manufacturing, R&D, distribution, marketing, risk splitting, etc.).

Contractual provisions (distribution of responsibilities, risks and profits among parties, etc.).

Economic situation (markets involved, existence of substitute goods or services, purchasing power of consumers, etc.).

Business strategies (innovation, diversification, market penetration, etc.).

NOTES

1. Traditional theories, based on perfect competition, eliminate firms from the analysis de facto, since single-product firms are considered to be identical, so that product, branch and firms become one and the same. See also P. Krugman (1990), *Rethinking International Trade*, MIT Press.
2. See Helpman E. and P. Krugmann (1985), *Market Structure and Foreign Trade*, MIT Press, Cambridge.
3. The implicit assumption in the ex ante work on the Single Market, extrapolating from past evidence, was that the development expected in intra-European trade would above all be intra branch, thereby containing adjustment costs while providing major gains in scope and efficiency (see for instance European Commission, 1990). For an ex post study of the impact of the Single Market on the nature of trade within the EU, see CEPII (1997).
4. Foreign-controlled affiliates account for substantially larger shares of exports and imports than of employment, turnover, or value added in most OECD-member countries for which data are currently available; see OECD, *Measuring Globalisation: The Role of Multinationals in OECD Economies*. For example, in the case of the United States, the shares of foreign-controlled affiliates in U.S. exports and imports of goods are each more than three times as large as their shares in US GDP or employment.
5. Excluded from this taxonomy of trade involving multinational firms are trade flows between foreign parent companies and unaffiliated firms in the compiling country; such flows typically fall outside of the scope of data that can be collected in surveys of multinational-firm operations.
6. The concept of the foreign parent group goes together with those of « fellow subsidiaries » or « related enterprises » used in international definitions of direct investment capital; see Paragraph 40 of the *OECD Benchmark Definition of Foreign Direct Investment* (Third Edition, 1996) and Paragraph 368 of IMF's *Balance of Payments Manual* (Fifth Edition, 1993).
7. In the third chapter of this *Handbook*, it was recommended that intra-firm trade calculations should consider firms within a group, where the affiliates are under the direct or indirect majority control of the parent corporation. In certain specific cases, minority controlling interests might also be taken into account (see Chapter 3). The term “associated enterprises” used in the *OECD Transfer Pricing Guidelines* states that two enterprises are associated if one of the enterprises participates directly or indirectly in the management, control or capital of the other or if “the same people participate directly or indirectly in the management, control, or capital” of both enterprises.
8. It is probably easiest to collect such data through surveys of affiliate operations. If the affiliate trade data are collected from customs documents instead, a question could be included on the documents asking filing parties that are foreign-controlled to specify the amount of trade that is with foreign parent companies and other affiliated foreign firms.
9. See M. Freudenberg and F. Lemoine “Central and Eastern European Countries in the International Division of Labor in Europe”, *CEPII Working Paper No. 99*, 5 April 1999 (available at <http://www.cepii.fr>)
10. See Mainardi (1986).

11. Moreover, empirical studies have found a correlation between the growth of intra-firm trade and that of intra-“industry” trade: see for example Greenaway (1986).
12. See for example Catwell on the link between international trade and international production: Vertically integrated production necessarily creates intra-firm trade, but this is not the same thing as intra-industry trade. In any set of trade data, there is a problem with aggregating different categories, whenever the classification selected is too broad, so that different products are grouped together within the same category of industries. For example, vertically integrated intra-firm trade is very important in the automotive sector, but the various categories of components used may differ greatly from one industry to the next. Under these conditions, the appearance of intra-industry trade may be no more than a statistical illusion. Despite this, Pomfret (1986) thinks that vertical specialisation, including intra-firm vertical integration, offers an important explanation (at least statistically) for intra-industry trade (Catwell 1994, page 314).
13. Where intra-firm trade is concerned, the treatment also is consistent with the *Manual on Statistics of International Trade in Services*, which defines “trade with related enterprises” as “trade with all enterprises with which there is a direct investment relationship”.
14. National Research Council (1992), Panel on Foreign Trade Statistics, “Behind the Numbers: US Trade in the World Economy”, Anne Y. Kestel (ed.), National Academy Press, Washington D.C.
15. Julius DeAnne (1990), *Global Companies and Public Policy*, Council on Foreign Relations Press, New York.
16. As an example, assume that for a given industry, country A exports goods worth 100 to country B and imports goods of the same value from country C. If the two partners B and C are considered as a unit, there will obviously be an overlap between exports (to B) and imports (from C): this trade would be classified as intra-industry, i.e. it would be purely artificial. On the other hand, if each partner is treated separately, it will be seen that A is exporting to B and importing from C: in this case, the transactions would be classed as inter-industry trade with each partner. The latter configuration is perfectly compatible with conventional theories, once the concept of “the chain of comparative advantage” is introduced (Deardorff, 1979; Lassudrie-Duchêne and Mucchielli, 1979). For example, an “intermediate country” would import a capital-intensive good from a country where capital is abundant, while exporting the same product to a country where capital is relatively scarce.
17. “Associated” as used here does not necessarily imply a majority controlling relationship as it does in the second chapter of this *Handbook*.
18. According to Article 9 of the OECD Model Tax Convention, “where conditions are made or imposed between two enterprises in their commercial or financial relations which differ from those which would be made between independent enterprises, then any profits which would, but for those conditions, have accrued to one of the enterprises but, by reason of those conditions, have not so accrued, may be included in the profits of that enterprise and taxed accordingly”.