

# Machinery and Equipment

DEREK BLADES

This chapter explains how products were defined and prices were collected for the expenditure classification “machinery and equipment” in the 2005 round of the International Comparison Program (ICP).

Several items of machinery and equipment—such as computers, motor vehicles, and furniture for restaurants and hotels—are purchased by households. It is not just the nature of the good that determines whether it falls within the classification machinery and equipment, but also who buys it. Identical passenger vehicles are classified as a household final consumption expenditure if households buy them, but as machinery and equipment if car rental companies buy them.

The procedure adopted for collecting prices for machinery and equipment in the 2005 ICP was similar to that used for household goods and services. Structured product descriptions (SPDs) were developed for different kinds of equipment and then converted to product specifications (PSs) so that comparable products could be priced in all countries. There were, however, some differences in that procedure and the one used for household goods and services.

- Because machinery and equipment are used in production, the technical characteristics that determine the performance of a machine or piece of equipment are very important. Examples of such characteristics are torque, power, speed, reach, and lifting capacity. However, for the 2005 ICP round many statistical offices may not have had the in-house expertise needed to appraise technical parameters of this kind. As a result, they may have needed to hire outside experts to decide whether particular kinds of equipment available in their countries were equivalent to those specified in the SPDs/PSs.
- A relatively small number of enterprises in some countries produce most of the machinery and equipment priced for the ICP. Thus countries were buying very similar products from a small number of manufacturers, and an SPD/PS for machinery and equipment typically referred to a specific model made by a particular producer.

- Machinery and equipment are purchased by producers—private enterprises, government, and nonprofit institutions. Because, as noted, the staff of statistical offices tend to be less familiar with machinery and equipment than with the goods and services purchased by households, the Global Office took the lead in drawing up the SPDs/PSs for the 2005 ICP round.
- Purchases of equipment tend to be made sporadically. Individual enterprises do not buy the same or similar types of equipment each year because that equipment is expected to last for several years. Thus in small countries there may be no purchases in some years of several types of equipment specified in the SPDs/PSs. It was therefore difficult in the 2005 ICP for countries to decide which products were sufficiently important to price.
- Some equipment goods are unique. Each one is designed for a specific location or purpose, and only one of its kind is produced. Examples are sea vessels, oil platforms, and nuclear power plants. No attempt was made in the ICP to price unique items of machinery and equipment. Pricing was confined to standard, generally mass-produced items.

In the ICP classification, the category machinery and equipment is broken down into two groups, metal products and equipment and transport equipment, and these are further disaggregated into eight basic headings (see boxes 14.1 and 14.2 for examples of the items included in the basic headings of these two groups). Countries are required to collect the prices of several specified items within most of these basic headings.

The first section of this chapter explains the standard method used by all countries taking part in the 2005 ICP (except for the 46 countries whose participation in the ICP was coordinated by Eurostat and the Organisation for Economic Co-operation and Development, OECD) to price machinery and equipment (also called equipment goods in the rest of this chapter). The method used by the Eurostat-OECD countries is described in the second section of this chapter. Both groups relied on very similar methods, thereby allowing a high degree of comparability between the resulting purchasing power parities (PPPs).

#### BOX 14.1 Coverage: Metal Products and Equipment Group

*Fabricated metal products, except machinery and equipment.* Prefabricated buildings of metal; bridges, bridge sections, towers, and lattice masts of iron or steel; reservoirs, tanks, vats, and similar containers of iron, steel, or aluminum for all materials; central heating radiators and boilers; steam generators; nuclear reactors; hand tools; casks, drums, cans, boxes, and similar containers of iron, steel, or aluminum for all materials except gas.

*General-purpose machinery.* Engines and turbines except aircraft, vehicle, and cycle engines; pumps and compressors; ovens other than bakery ovens; furnaces, furnace burners, and incinerators; lifting and handling equipment such as jacks and hoists for raising vehicles, derricks, cranes, forklift trucks, skip hoists, lifts, escalators, and moving walkways; nondomestic cooling and ventilation equipment.

*Special-purpose machinery.* Agricultural and forestry machinery; machine tools; machinery for metallurgy, mining, quarrying, and construction; machinery for food, beverage, and tobacco processing; machinery for textile, apparel, and leather production; other special-purpose machinery.

*Electrical and optical equipment.* Typewriters and word processing machines; cash registers; photocopying apparatus and printing machinery; automatic banknote dispensers and coin-sorting machines; computers and related equipment; electric motors, generators, and transformers; electricity distribution and control apparatus; accumulators and batteries; lighting equipment; radio and television equipment; electric apparatus for line telephony; sound or video recording apparatus; medical, dental, and veterinary equipment, instruments, and appliances; instruments and appliances for measuring, checking, testing, navigating, and other purposes; industrial process control equipment.

*Other manufactured goods n.e.c. (not elsewhere classified).* Office, shop, and hotel furniture, etc.

*Software.* Computer software that a producer expects to use in production for more than one year; includes purchases of off-the-shelf software and expenditure on development of software within the enterprise.

## BOX 14.2 Coverage: Transport Equipment Group

*Motor vehicles, trailers, and semitrailers.* Passenger cars, taxi cabs, vans, buses, coaches, trolley buses, lorries, trucks, tankers, tractor units for semitrailers, trailers, semitrailers, caravans, and special-purpose motor vehicles such as dumpers for off-highway use, breakdown lorries, crane lorries, ambulances, fire trucks, concrete mixer lorries, road sweeper lorries, mobile radiological units, and motorized sleighs, including their bodies (coachwork), specialized parts, and engines.

*Other transport equipment.* Cruise ships, excursion boats, ferry boats, hovercraft, cargo ships, barges, lighters, tankers, refrigerated vessels, fishing vessels, factory ships; tugboats and pusher craft, ice-breakers, dredgers, cable ships, light vessels, research vessels, and other nontrading ships (except naval ships); floating docks, floating dredges, oil rigs, and other floating or submersible drilling or production platforms; specialized ship parts other than engines; all vessels that have undergone extensive reconstruction and conversion; all railway and tramway locomotives, maintenance and service vehicles and rolling stock (such as passenger coaches, luggage vans, post office coaches, goods wagons, tank wagons, and refrigerated vans) intended for railway service or for service in mining and industrial operations; their specialized parts other than engines; airplanes, helicopters, balloons, gliders, spacecraft, and satellites, including their specialized parts and engines.

Experience from the 2005 ICP suggests that for the 2011 ICP some countries will not be able to follow the standard method for pricing machinery and equipment. Thus the third section of this chapter describes an alternative method that may be used—the price factor method (PFM). Suitable only for countries that import most of their machinery and equipment, it involves tracking the various costs or “price factors” that intervene between the ex-factory price of machinery and equipment and its price when installed by the purchaser.

The final section of this chapter draws lessons from the 2005 ICP for possible improvements in the 2011 ICP.

## Standard Method for Pricing Equipment Goods

The standard method for pricing equipment goods is similar to that followed for consumer goods and services; countries collect prices for identical or very similar products—sometimes referred to as “specification pricing.”

### Pricing Rules

To be consistent with the national accounts, countries are required to provide prices for equipment goods that are consistent with the valuation of those goods as fixed capital assets in the national accounts. Thus the prices must include import duties and other product taxes actually paid by the purchaser, the costs of transporting the asset to the place where it will be used, and any charges for installing the asset so that it ready for use in production. Deducted from the price are any of the discounts generally available to most producers.

The following rules should be observed in reporting prices for equipment goods:

- *Transport costs.* When the prices of equipment goods do not include transport costs, these costs should be estimated by countries. They would determine the average distance over which the items are transported from the factory where they are made or, for imports, the port of entry.
- *Installation costs.* Costs are usually associated with the installation of fixed equipment, and these costs are included in the gross fixed capital formation (GFCF) in the national accounts. Installation charges include not only those paid by the purchaser for physical installation of an item at a factory or other site but also any charges for testing or calibrating the equipment. In the case of transport equipment, there are usually no installation costs.

- *Product taxes.* The price should only include nondeductible product taxes. Countries that levy a value added tax (VAT) normally allow purchasers to deduct the full amount of the tax on capital goods. Sales and other product taxes, and sometimes import duties, may also be fully or partly deductible on capital goods.
- *Discounts.* The price should refer to the purchase of a single item so that it is not affected by discounts that may be available for large orders. The price of the single item should be reported after deducting any discount that is customarily available to most purchasers and that is available for most of the year.

The national average prices are required. Country experts follow two guidelines in deciding how these prices are to be collected. First, in some small countries it may be sufficient to collect prices in only a single location such as the capital city or the largest industrial or commercial town. Second, in larger countries that have several centers of significant industrial and commercial activity, prices will have to be collected in several of these centers in order to calculate a national average price.

In many countries, a single dealer has the rights to sell the specified type of equipment. In this case, a single price observation will be sufficient. In other countries, however, there may be several distributors of the specified type of equipment, and in this case several price observations will be required to establish the average national price. The decision as to whether one or more price observations are necessary is left to the national experts.

The prices reported should be the average prices for the reference year—that is, they should be the average of the prices collected at regular intervals throughout the year. However, experience shows that if all countries price equipment goods during the same period, there is no need to collect prices throughout the year. Price collection at midyear was recommended for the 2005 ICP.

A significant proportion of the GFCF in equipment goods in some countries consists of imports of second-hand goods, some of which may have been reconditioned. Second-hand goods that are comparable for pricing purposes are difficult to find. Substantial quality adjustments may be necessary to make the prices comparable, and such quality adjustments are presently not feasible. Thus in the 2005 ICP price collection was confined to new equipment goods. The prices of second-hand equipment goods were not used even when those goods were actually more representative than new goods. Second-hand goods will also be omitted from pricing in the 2011 ICP.

## Structured Product Descriptions for Equipment Goods

In the 2005 ICP, the SPDs were drawn up by the Global Office in much the same way as those for household consumer goods and services. However, for consumer goods and services each region converted the SPDs to product specifications after the participating countries agreed on which consumer goods and services are commonly purchased by households in their countries. For equipment goods, the Global Office converted the SPDs to PSs for 108 “core” items, and these PSs served as the starting point for the regional coordinators in drawing up their own regional lists. Regional lists included not only a minimum of 80 equipment goods drawn from the core list but also other equipment goods that were important for particular regions.

The SPDs/PSs drawn up by the Global Office were used in the following manner for the 2005 ICP:

- For each type of equipment good, the Global Office identified the manufacturers and model numbers of the equipment to be priced. At least two manufacturers and model numbers were specified for each SPD/PS.

- Countries were asked to provide prices for the models in the order of preference in which they were listed—specifically, the first model listed was to be priced by countries if it was available and in common use; if not, the next model in the list was to be priced, and so on.
- If two or more of the listed models were available and in common use, countries were asked to provide prices for all of them.
- If none of the models listed was available and in common use, countries were asked to price an equivalent model commonly used. An equivalent model was one that met the same needs with equal efficiency. The country entered the name of the manufacturer and the model number in the “other model” space on the SPD/PS reporting form (see box 14.3).

If countries decided to price a model other than one of those specified in the SPD/PS, they also had to provide information on the product characteristics. This part of the SPD/PS did not have to be completed if prices were reported for one of the specified items of equipment.

### Format of an SPD/PS

Box 14.3 is an example of an SPD/PS for equipment goods. The air compressor depicted is commonly used to power construction equipment such as pneumatic drills and ground compactors. The form begins with a short description of an air compressor together with a picture of a typical model. The manufacturer’s name and model number are then listed for the “preferred model,” followed by two alternatives. If a country decided to price one or more of these three models, it provided the price information called for in the next part of the SPD/PS.

If a country decided to price none of the three specified models because they were not available or were only rarely purchased in the country, it selected an equivalent model and gave the manufacturer’s name and model number in the space provided. It then supplied the price as well as the “product characteristics.” Both the “main characteristics” and “other features” were required.

The product characteristics of “other models” were used by the regional coordinator to determine whether those models really were equivalent to one of the three specified models. If the coordinator decided that the other model was indeed equivalent, its price was used to calculate price relatives with whichever of the three specified models was considered most similar to the other model. If the other model was found to be not equivalent to any of the three specified models, the price information was discarded, or the regional coordinator found the other model to be equivalent to another model priced by another country. In this case, a new product was created for this type of air compressor, and the price information was used to calculate a PPP for the two countries concerned (new products created this way are referred to as “splittings.”)

### Core Items and Regional Lists

Table 14.1 shows how the 108 core items identified by the Global Office for the 2005 ICP were distributed among the basic headings for equipment goods. The full list of the core items used in the 2005 ICP appears in annex A.

When regions drew up their own lists for the equipment goods to be priced, they looked first at these 108 items and included at least 80 of them in their own regional lists. They also included items not on the core list if those items were important in their countries.

### Sources of Price Information

The prices of equipment goods can be obtained directly from producers, importers, or distributors, or from their catalogues. For the 2005 ICP, the prices were collected by the method or combination of methods that countries found the most convenient such as personal visit, telephone, letter, or Internet.

**BOX 14.3** Example of SPD/PS for Equipment Goods

**Basic Heading: General-Purpose Machinery Basic Heading Code: 150112.1**

**Product Name: COMPRESSOR**

**Code: 01**

**DESCRIPTION**

These are air compressors. They may be electrically driven or powered by a diesel or gasoline engine. They are most often used to power construction and drilling equipment.



**MANUFACTURER AND MODEL NUMBER**

Preference order	Manufacturer	Model number
Preferred model	Atlas-Copco	XM 659P
Alternative 1	Mitsubishi	400098
Alternative 2	Rand	L-M 51
Other model	Specify _____	Specify _____

**PRICE (in local currency units)**

<b>A</b>	<b>Price of equipment</b>	
B	Installation cost if not included in A	
C	Transportation cost if not included in A	
D	Nondeductible tax if not included in A	
E	Deductible tax if included in A	
F	Discount if not included in A	
<b>G</b>	<b>Total cost [A + B + C + D – E – F]</b>	

**PRODUCT CHARACTERISTICS**

**This part is to be completed only if *other model* has been priced.**

**Main Characteristics**

Power required (kW)	
Max. pressure (bars)	
Rated operating pressure (bars)	
Rated delivery volume (liters/min.)	
Shipping weight (kg)	
Max. speed (rpm)	
Sound level	
Maximum pressure (dBA)	
Operating pressure and volume (dBA)	

**BOX 14.3** Example of SPD/PS for Equipment Goods (*continued*)

**Other Features**

Rotary  
 Rotary screw  
 Reciprocating piston

Integral storage (liters): \_\_\_\_\_

Number of stages: \_\_\_\_\_

Outlet size: \_\_\_\_\_

Number of outlets: \_\_\_\_\_

Sump drain  
 Storage drain

Cooling:  Air  
 Liquid  
 Closed system  
 Open system

Controls:  Mechanical  Electrical  
 Hydraulic  Electronic

Integral discharge dryer  
 Portable  
 Stationary

Height (mm): \_\_\_\_\_

Length (mm): \_\_\_\_\_

Width (mm): \_\_\_\_\_

Drive:  Belt  
 Shaft/disconnect  
 Direct/coupled

**TABLE 14.1** Core List of Equipment Goods, ICP 2005

Basic heading	Description	Number of products
150111.1	FABRICATED METAL PRODUCTS	5
150112.1	GENERAL-PURPOSE MACHINERY	15
	A. Engines and turbines, pumps, and compressors	10
	B. Other general-purpose machinery	5
150113.1	SPECIAL-PURPOSE MACHINERY	39
	A. Agricultural and forestry machinery	2
	B. Machine tools	6
	C. Machinery for metallurgy, mining, quarrying, and construction	22
	D. Machinery for food, beverage, and tobacco processing	4
	E. Machinery for textile, apparel, and leather production	0
	F. Other special-purpose machinery	5
150114.1	ELECTRICAL AND OPTICAL EQUIPMENT	29
	A. Office machinery	5
	B. Computers and other information processing equipment	9
	C. Electrical machinery and apparatus	2
	D. Radio, television, and communications equipment and apparatus	3
	E. Medical, precision, and optical instruments, watches, and clocks	10
150115.1	OTHER MANUFACTURED GOODS n.e.c.	0
150121.1	MOTOR VEHICLES, TRAILERS, AND SEMITRAILERS	11
150121.2	OTHER ROAD TRANSPORT	0
150122.1	OTHER TRANSPORT	0
150311.1	SOFTWARE	9
TOTAL		108

Source: ICP.

However, the prices had to be adjusted to conform to the valuation principles that, as just described, called for taking into account transport charges, installation costs, product taxes, and discounts.

The sources most often used for collecting the price information were the following:

- *Within a national statistical office.* Those who compile a producer price or an import price index are likely to have the most familiarity with the types of goods being compared for these basic headings. For some items such as automobiles and computers, the comparisons used for household consumption are also relevant to equipment, although the prices collected for the household consumption expenditure had to be adjusted by subtracting the value added taxes and other product taxes that are payable by households but usually can be deducted by enterprises.
- *Within the country.* Equipment distributors and dealers know which models are available, their detailed characteristics, and prices. When prices were obtained from dealers, countries had to ensure that all product taxes and installation charges were included.

Government departments purchase transport and other equipment on a regular basis. Such purchases are often centralized under a “public works” or “central supply” department. They may buy directly from manufacturers, but often they will also use local dealers and distributors.

- *Outside the country.* A list of websites of equipment goods manufacturers was provided to countries for the 2005 ICP. Websites, which are often available in more than one language and may be tailored to a particular region, usually give all the technical information needed for the SPDs/PSs. They often also provide the names and contact information for dealers and distributors. However, in the 2005 ICP round the price information obtained from websites had to be adjusted to conform to the valuation principles just outlined for taking into account transport charges, installation costs, product taxes, and discounts.

## Editing Prices

In the 2005 ICP, the main responsibility for editing the technical characteristics of the goods that countries priced for the equipment goods survey rested with the regional coordinator. Countries, however, had to ensure that the regional coordinator was able to identify matches and mismatches among the goods priced. Before sending their prices to the regional coordinator, countries were required to verify that the reporting forms were complete—that is, they contained the name and number of the make and model priced and the product characteristics. It is in the interest of countries to provide this information from the beginning because it reduces the subsequent response burden that editing imposes.

Editing the prices of equipment goods by simply examining and comparing their prices alone is not sufficient because of the complexity of the items priced. The prices for some specifications may appear plausible and consistent across countries, but the goods priced are not necessarily comparable. The technical characteristics of the items that are not outliers still must be checked against each other, and any mismatches discovered must be treated in the same manner as outliers identified by the editing procedure.

In the 2005 ICP round, the technical characteristics of outliers identified by regional coordinators using the Dikhanov or Quaranta editing procedure were checked against the technical characteristics of the items priced by other countries. As a result, either the technical characteristics of the outlier matched the technical characteristics of the items priced by at least some of the other countries, or the technical characteristics did not match the technical characteristics of any of the



items priced by the other countries. In the first case, the outlier was referred back to the reporting country, which was asked to confirm the price. In the second case, the country was asked to provide a price for an equipment good whose technical characteristics matched the technical characteristics of the goods priced by some of the other countries. Depending on the country's response, the price of the outlier was retained, replaced, or dropped.

## Eurostat-OECD Methodology

The general approach used for the Eurostat-OECD countries was very similar to the standard method used by other regions, although there were some differences in detail.<sup>1</sup> The sample Eurostat-OECD product specification and reporting form shown in box 14.4 is for a tractor unit—that is, the power unit of a heavy-goods vehicle consisting of the engine, driver's cab, and power train. Countries were asked to price a particular model of a Mercedes-Benz tractor unit. One difference between this form and the SPD/PS described earlier is that the product characteristics of the proposed model are listed, and even if a country prices precisely this model it is still required to report the product characteristics because a model may have different technical characteristics in other countries. The standard method followed by other regions and described in previous section assumes that a model number guarantees that it will be identical no matter where it is sold.

In the example shown in box 14.4, the reporting country (Austria) had priced a different make and model because, as explained in the notes section, “The model specified is not available. Expected on the market early next year.” The Scania tractor unit differs from the proposed model in a number of ways—for example, it is heavier, has fewer gears, and has a higher power output. The Austrian pricing experts, nevertheless, concluded that the Scania is equivalent to the Mercedes-Benz, and Eurostat-OECD agreed with them.

The SPDs/PSs used in the standard method for the 2005 ICP listed all the alternative models on the same reporting form. By contrast, each Eurostat-OECD form referred to a single make and model, but there were usually several alternatives for each product. In the case of a tractor unit, for example, three different models were proposed, and three separate forms were provided. Unlike the SPD/PS, the Eurostat-OECD form did not specifically ask countries to propose their own models if none of the proposed models was considered suitable. However, countries were allowed to report the prices of models that were judged to be technically different from the proposed models, which could lead to the creation of new products (“splittings”) in the same way described earlier for the standard method.

Table 14.2 shows the number of products, the number of alternative specifications, and the minimum number of products that the Eurostat-OECD countries were required to price for each type of equipment for the 2005 ICP round. For most types, countries were required to price between three and five items.

Another difference between the Eurostat-OECD reporting form and the SPD/PS described in the previous section is that the Eurostat-OECD countries were required to specify whether the products they had priced were “representative.” According to the Eurostat-OECD PPP manual, “the product priced is representative [if] its price level is representative of the price level in the country for that type of product. Representative products are usually those most frequently sold. As representative products generally have lower price levels than unrepresentative products, it is important to know about the representativity of products when validating their prices and calculating their PPPs” (Eurostat and OECD 2006). In explanation, the equipment goods that a country has identified as representative are given more weight in calculating its PPPs, and it is widely accepted that this method produces a more accurate set of PPPs.

**BOX 14.4** Product Specification and Price Reporting Form Used by Eurostat-OECD:  
An Example

EQUIPMENT GOODS SURVEY 200X				Country
<b>16.11: Tractor unit</b>				<i>Austria</i>
<b>Product</b>		<b>Proposed</b>		<b>Priced</b>
Make (and nationality):		Mercedes Benz (German)		<i>Scania (Swedish)</i>
Model:		ABC-18-4x2		<i>XYZ-19-4x2</i>
<b>Specifications</b>		<b>Metric</b>	<b>Imperial</b>	<b>National</b>
01	GVW	18,000 kg	17.7 tons	<b>19,000 kg</b>
02	Wheelbase	5,700 mm	224 in.	<b>5,500 mm</b>
03	Engine capacity	11,946 L	729 cu. in.	<b>12.0 L</b>
04	Engine power output	292 kW	394 bhp	<b>338 kW</b>
05	Gearbox: number of forward speeds	16	16	<b>14</b>
06	Type of suspension: front	spring	spring	<b>spring</b>
07	Type of suspension: rear	air	air	<b>air</b>
08	Type of braking	ABS	ABS	<b>ABS</b>
09	Type of cab	1,845 mm	73 in.	<b>1,900 mm</b>
10	With standard roof	yes	yes	<b>yes</b>
11	Fixed fifth wheel coupling	included	included	<b>included</b>
12				
<b>Terms and conditions</b>				
a	Order quantity	one	one	<b>one</b>
b	Unit price	one	one	<b>10,500</b>
c	Currency	specify	specify	<b>euros</b>
d	Delivery costs to be included	yes	yes	<b>yes</b>
e	Installation costs to be included	no	no	<b>no</b>
f	Discount to be included	yes (%)	yes (%)	<b>-525 (i.e., 5% of the unit price of €10,500)</b>
<b>Total unit price without VAT</b>				9,975
<b>Representativity and comparability</b>				
Is the product priced representative (yes) or unrepresentative (no)?				<b>yes</b>
Is the product priced identical (1), equivalent (2), or not comparable (3) to the one specified?				<b>2</b>
<b>Options</b>				
<i>Price of standard model. No options available.</i>				
<b>Notes</b>				
<i>The model specified is not available. Expected on the market early next year.</i>				
<i>Delivery costs not invoiced separately. Included in unit price.</i>				
<b>Website address</b>				
www.mercedesbenz.com				

Note: This example merely illustrates the basic format and content of the reporting form; the technical details and reported price are fictitious.

**TABLE 14.2** Pricing Schedule: Eurostat-OECD Countries, 2003

Expenditure classification code	Price collecting code	Basic heading	Number of products	Number of alternative specifications	Minimum number of products to be priced
150111.1	01	Fabricated metal products, except machinery and equipment	5	13	3
150112.1	02	Engines and turbines, pumps, and compressors	4	6	3
150112.2	03	Other general-purpose machinery	6	17	4
150113.1	04	Agricultural and forestry machinery	10	28	5
150113.2	05	Machine tools	7	11	5
150113.3	06	Machinery for metallurgy, mining, quarrying, and construction	5	9	3
150113.4	07	Machinery for food, beverage, and tobacco processing	5	15	3
150113.5	08	Machinery for textile, apparel, and leather production	7	12	5
150113.6	09	Other special-purpose machinery	6	17	5
150114.1	10	Office machinery	4	9	3
150114.2	11	Computers and other information processing equipment	7	13	6
150114.3	12	Electrical machinery and apparatus	6	15	4
150114.4	13	Radio, television, and communications equipment and apparatus	5	5	4
150114.5	14	Medical, precision, and optical instruments, watches, and clocks	11	22	7
15a0115.1	15	Other manufactured goods n.e.c.	3	6	3
150121.1	16	Motor vehicles, trailers, and semitrailers	18	30	12
150312.1	17	Software	7	7	5
Total			116	235	80

Source: ICP.

Note: The pricing schedule is not fixed. It evolves from one price survey to the next.

Overall, it is clear that the Eurostat-OECD methodology and the standard method described in the preceding section were very similar. However, there were some differences:

- The Eurostat-OECD countries were required to conduct “presurveys” to determine the availability of different types of equipment and whether new products had been introduced or old products phased out. They then used the presurvey results when they jointly drew up the product list.
- The Eurostat-OECD reporting form allowed for the possibility that a given model number may have different technical characteristics when sold in different markets.
- The Eurostat-OECD countries were required to identify representative products.

For these reasons, the Eurostat-OECD approach is likely to produce more accurate PPPs, but the two methods are sufficiently similar to ensure good comparability between the Eurostat-OECD countries and those in other regions.

## Calculating Approximate PPPs Using the Price Factor Method (PFM)

The standard method, which requires countries to price specified products, is generally accepted as the most accurate way to calculate PPPs for equipment goods. The alternative, the price factor method, is certainly inferior, but it is described here because the standard method proved difficult for many countries in the 2005 ICP. The SPDs/PSs referred to items that were not commonly used in their countries, or purchases of specific types of equipment goods were sporadic, making it difficult to identify a realistic price for a piece of equipment that may not have been purchased in a recent year. Another problem was expense; national statistical offices usually do not have the in-house expertise needed to collect prices for equipment goods. Some had to hire equipment experts to identify the products specified in the SPD/PS or find close substitutes if what was specified in the SPD/PS was not available in their countries. In some cases, outside experts also had to be consulted to determine the price.

The method described here is a fallback solution for countries that do not have the financial resources or expertise to use the standard method. It is called the price factor method because it involves decomposing the price of machinery and equipment into its component “price factors.” The countries that would use the PFM would import almost all of their equipment goods, and so the PFM starts with the ex-factory price of an equipment good in the exporting country and follows it through to its final price when it is installed and ready to use in the importing country.

### Pros and Cons of the Price Factor Method

One advantage of the PFM is that (approximate) PPPs are obtained using information that is already available in many national statistical offices. Countries that have an input-output or supply and use table—even if it not very recent—will have estimates of the margins and other costs required by the PFM. Countries that use a commodity flow method for estimating gross fixed capital formation will have the estimates as well. For these reasons, the PFM is an attractive alternative for countries with limited resources.

By means of the standard method, PPPs are obtained from the ratios of the prices of particular types of equipment goods *installed and ready for use* at the purchasers’ establishments in each country. For an imported equipment good, this price can be broken down into the ex-factory price of the good and a series of costs, or “margins,” that the purchaser incurs to bring it from where it was produced to where it will be used in production. These margins are shown in box 14.5. They consist essentially of transport and trade margins, customs duties and other taxes, and, except for transport equipment, installation costs.

Consider two countries, A and B, that import a particular kind of equipment good from the same producer. If all the margins incurred by countries A and B are expressed in a common currency—say U.S. dollars—then

$$(14.1) \quad \frac{P_A}{P_B} = \frac{XR_{\frac{A}{US}}(F + a_1 + a_2 + \dots + a_n)}{XR_{\frac{B}{US}}(F + n_1 + b_2 + \dots + b_n)}$$

where  $P_A$  and  $P_B$  are the installed, ready-to-use prices of the machine in countries A and B, both expressed in their national currencies;  $XR_{\frac{A}{US}}$  and  $XR_{\frac{B}{US}}$  are the number of units of A’s and B’s currency that can be purchased for US\$1.00;  $F$  is the ex-factory price of the machine in U.S. dollars;  $a_1, \dots$  are the  $n$  margins in U.S. dollars incurred by the importer in country A, both in the exporting

**BOX 14.5** Components of the Price of an Imported Equipment Good Installed and Ready for Use in the Importing Country

**Ex-factory price in exporting country**

plus	surcharge minus discount for country or region
plus	product taxes minus subsidies in exporting country
plus	trade margin in exporting country
plus	transport within exporting country
plus	wharfage (fee for using the wharf) in exporting country
plus	fee for customs documentation in exporting country
<i>equals</i>	<i>f.o.b. (free on board) price in exporting country</i>
plus	international freight
plus	insurance costs
<i>equals</i>	<i>c.i.f. (cost, insurance, freight) price in importing country</i>
plus	fee for customs documentation in importing country
plus	customs duty in importing country
plus	wharfage (fee for using the wharf) in importing country
plus	product taxes minus subsidies in importing country
plus	trade margins in importing country
plus	transport within importing country
plus	installation costs at the purchaser's establishment
<i>equals</i>	<i>installed, ready-to-use price in importing country</i>

country and in country A itself; and  $b_1 \dots$  are the  $n$  margins in U.S. dollars incurred by the importer in country B, both in the exporting country and in country B itself.

Because  $\frac{P_A}{P_B}$  is the bilateral *purchasing power parity* for the machine in question with B as the base country, and because  $\frac{XR_{\frac{A}{US}}}{XR_{\frac{B}{US}}}$  is the exchange rate between countries A and B, equation (14.1) can be rewritten as

$$(14.2) \quad PPP_{\frac{A}{B}} = \frac{XR_{\frac{A}{B}}(F + a_1 + a_2 + \dots + a_n)}{(F + b_1 + b_2 + \dots + b_n)}$$

where  $PPP_{\frac{A}{B}}$  is the bilateral PPP using B as the base country, and  $XR_{\frac{A}{B}}$  is the exchange rate between countries A and B—specifically, the number of units of currency A that can be purchased by one unit of currency B.

If the  $a$ 's and  $b$ 's are converted to ratios of the ex-factory price and are denoted by  $\alpha$ 's and  $\beta$ 's, equation (14.2) can be rewritten as

$$(14.3) \quad PPP_{\frac{A}{B}} = \frac{XR_{\frac{A}{B}} \left( F + F \sum_{i=1}^n \alpha_i \right)}{F + F \sum_{i=1}^n \beta_i}$$

or

$$(14.4) \quad PPP_{\frac{A}{B}} = XR_{\frac{A}{B}} \left( \frac{1 + \sum_{i=1}^n \alpha_i}{1 + \sum_{i=1}^n \beta_i} \right)$$

The term in brackets in (14.4) is an *adjustment factor*, required so that the exchange rate between countries A and B equals the PPP. It is one plus the sum of the margins paid in one country divided by one plus the sum of the margins paid in the other. These margins are the various items listed in box 14.5, expressed as ratios of the ex-factory price.

## Practical Application

Data limitations require three modifications of the formulation of the “ideal” PFM given in equation (14.4).

### When Ex-factory Prices Are Not Available

The adjustment factor in equation (14.4) requires knowledge of the ex-factory price of the piece of equipment in the exporting country. In practice, however, statistical offices in importing countries do not have information on ex-factory prices, nor do they usually have any information on the costs or margins incurred in the exporting country from the point at which the goods are being delivered to the point from which they are being exported.

Therefore, the costs or margins must be converted to the ratios of some other price that is likely to be similar in the countries concerned even if it is not identical. The best choice would be the f.o.b. price in the exporting country, but most countries record their imports at c.i.f. values—that is, they include the freight and insurance costs incurred to bring the goods to the port of entry. *It is therefore suggested here that the c.i.f. values of imported machinery and equipment be converted to an approximate f.o.b. basis using the ratio of total international insurance and freight charges to total merchandise imports.*

### Moving from PPPs for Specific Types of Equipment Goods to Averages for All Equipment Goods

The earlier discussion dealt with a specific equipment good imported from a specific producer in an exporting country. However, it is proposed here that exchange rates be adjusted to approximate PPPs for two broad groups of equipment goods imported from all sources: metal products and equipment (150110.0) and transport equipment (150120.0). This adjustment means that the various margins used for the adjustment factor in equation (14.4) will not be the costs incurred for importing a specific type of equipment and machinery from a particular country, but rather averages for all of the two types of equipment goods from whatever country they are imported. For example, the transport margins must be the average margins charged on transporting metal products and equipment as a whole and transport equipment as a whole from the port of arrival to the place where they are to be used. The customs margin must be the average rate charged on imported metal products and equipment as a whole and on imported transport equipment as a whole.

### Ignoring Some Margins

Several of the margins listed in box 14.5 may be zero or small relative to the initial ex-factory price and can be ignored. In addition, statisticians in the importing countries will not be able to estimate the costs incurred in the exporting country. The costs and margins that are likely to be relatively large and that countries could reasonably be expected to report are as follows:

- Customs duties
- Nondeductible VAT and other taxes on products

- Transport costs in the importing country
- Wholesale and retail trade margins in the importing country
- Installation costs.

Countries are also required to provide the c.i.f. values of imports of the two groups of equipment goods, the c.i.f. value of total merchandise imports, and the insurance and freight costs of total merchandise imports. The reporting form for collecting these eight items for the two groups of equipment goods, metal products and equipment and transport equipment, appears in annex B.

## Calculating the Adjustment Factor

The information collected on the reporting form in annex B can be used by the regional coordinators

to calculate an approximate version of the adjustment factor  $\left(\frac{1 + \sum_{i=1}^n \alpha_i}{1 + \sum_{i=1}^n \beta_i}\right)$  and multiply it by the exchange rate to obtain an approximate PPP. The four steps are as follows:

1. The reported c.i.f. value of imports of each of the two groups of equipment goods—metal products and machinery and transport equipment—is converted to an approximate f.o.b. value using the ratio of total international insurance and freight to the c.i.f. value of total merchandise imports. This f.o.b. value is used as the closest practical approximation of the ex-factory values, which should, in principle, be used as the basis for calculating the ratios in the adjustment factor.
2. Each of the following items is calculated as a ratio of the (approximate) f.o.b. value of imported equipment goods: customs duties, nondeductible value added taxes and other taxes on products, transport costs in the importing country, retail and wholesale trade margins in the importing country, and installation costs. The calculations are made separately for the two groups, metal products and machinery and transport equipment. These ratios are summed for each country to obtain  $1 + \sum_{i=1}^n \alpha_i$  for country A,  $1 + \sum_{i=1}^n \beta_i$  for country B, and so on for all the countries in the region for which the PFM is being used.
3. The exchange rates between each pair of countries are then multiplied by the relevant adjustment factor to obtain pairs of bilateral PPPs for the two groups.
4. These bilateral PPPs are made transitive by the Gini-Éltető-Köves-Szulc (GEKS) procedure.

Box 14.6 is a worked example showing the calculations for steps 1, 2, and 3 of the adjustment procedure for two countries. Because only two countries are used in this example, step 4 is not required. But when the PFM is used by more than two countries, the PPPs obtained for the two countries will have to be made transitive by the GEKS procedure.

In the worked example in box 14.6, the margins shown in the first part of the worksheet are generally higher in country A than in country B. As a result, the PPP for country A is higher than its exchange rate, and the PPP for country B is lower than its exchange rate. If the exchange rates had been used instead of the PPPs, the volume of equipment goods in country A would have been overestimated and the volume of equipment goods in country B underestimated.

**BOX 14.6** Worked Example for Imported Metal Products and Machinery

The following shows how the first three steps just listed are carried out for metal products and machinery imported by two countries, A and B. The first part of the box lists the basic information required.

	Country A (national currency)	Country B (national currency)
C.i.f. value of imports of metal products and machinery	3,000	16,000
Customs duties	250	800
Nondeductible value added taxes and other taxes on products	300	1,000
Transport costs	80	300
Retail and wholesale trade margins	160	800
Installation costs	120	580
C.i.f. value of all merchandise imports	75,000	340,000
Insurance and freight on all merchandise imports	800	3,000
Units of local currency per U.S. dollar	35	75

At step 1, c.i.f. values are converted to approximate f.o.b. values. (These f.o.b. values are the closest practical approximation to the ex-factory values.)

*Step 1:*

Convert c.i.f. value of imports of metal products and machinery to approximate f.o.b. values

$$\text{Country A: } 3,000 \times \left[ 1 - \left( \frac{800}{75,000} \right) \right] = 2,968$$

$$\text{Country B: } 16,000 \times \left[ 1 - \left( \frac{3,000}{340,000} \right) \right] = 15,859$$

At step 2, the sums of each country's customs duties, nondeductible value added taxes, and other products on taxes, transport costs, retail and wholesale trade margins, and installation costs are converted to ratios of the approximate f.o.b. values of the goods imported by each country.

*Step 2:*

$$\text{Country A: } \frac{(250 + 300 + 160 + 80 + 120)}{2,968} = 0.307$$

$$\text{Country B: } \frac{(800 + 1,000 + 800 + 300 + 580)}{15,859} = 0.219$$

At step 3, the currency exchange rates between countries A and B are converted to approximate PPPs between A and B by multiplying them by the ratios of the margin ratios calculated in step 2.

*Step 3:*

Adjust exchange rates to approximate bilateral PPPs

$$\text{Country A: exchange rate } \frac{A}{B} = \frac{35}{75} = 0.467. \text{ Therefore PPP: } \frac{A}{B} = 0.467 \times \frac{(1 + 0.307)}{(1 + 0.219)} = 0.500$$

$$\text{Country B: exchange rate } \frac{B}{A} = \frac{75}{35} = 2.143. \text{ Therefore PPP: } \frac{B}{A} = 2.143 \times \frac{(1 + 0.219)}{(1 + 0.307)} = 2.000$$

## Lessons from ICP 2005

There are three ways in which the calculation of PPPs for equipment goods could be improved in the 2011 ICP round:

1. The price reporting forms for the standard method should require countries to report the technical characteristics for all items that a country has priced even if countries have provided prices for just one of the specified models. At present, countries are required to



do this only if they have priced an “other model.” Eurostat-OECD countries are required to report the technical characteristics of all the items priced because it has been found that an item with the same model number is not necessarily identical in every country. For example, manufacturers may adapt models to meet the legal safety standards, which differ from country to country. A safety feature mandatory in one country may not be incorporated in the model sold in a country with lower safety standards.

2. Each country should identify “important” items in the core and regional lists of equipment goods. An “important” product is one that accounts for a relatively large share of expenditure within each basic heading. In the 2011 ICP round, countries will be asked to do make such an identification for the goods and services included in the household final consumption expenditure, and it should not be too difficult to do the same for equipment goods.

As noted earlier, Eurostat-OECD countries are asked to identify items that are “representative” of the price level of all the products included in each basic heading. The term *important* is used in the 2011 ICP instead of *representative*, but this change is not just one in terminology. *Representative* refers to price levels, whereas *important* refers only to the expenditure share of each product in the basic heading. Although this expenditure share cannot be known exactly, countries should be able to rank the various models of, say, forklift trucks by their likely shares in expenditures on items in the basic heading general-purpose machinery. The one or two that are “best-sellers” would be rated “important” and the others as “less important.” Important products can be given more weight in calculating a country’s PPP, which will lead to an improvement in accuracy.

3. The Global Office prepares the core list of equipment goods. In the ICP 2005 round, this task was carried out with relatively little input from the national statistical offices and regional coordinators because neither had much experience with the market for equipment goods in their countries. The experience gained in the 2005 round suggests that the regional coordinators and national statistical offices should have more say in the selection of products, brands, and models. In particular, countries should *suggest* that the equipment goods they have identified as important be included in the core list and *insist* that they be included in the regional list.

## ANNEX A

## Core List of Equipment Goods, ICP 2005

Basic heading code	Basic heading title	Product name	Product code	No. of products
150111.1	<b>FABRICATED METAL PRODUCTS</b>			
		Horizontal cylindrical storage tank (5,000 liters)	1	
		Horizontal cylindrical storage tank (10,000 liters)	2	
		Tank for storing liquid food and beverage products (1,000 liters)	3	
		Tank for storing liquid food and beverage products (5,000 liters)	4	
	Pressurized gas storage tank	5	<b>5</b>	
150112.1	<b>GENERAL-PURPOSE MACHINERY</b>			
	<b>A. Engines and turbines, pumps and compressors</b>			
		Air compressor—small	1	
		Air Compressor—towed	2	
		Industrial diesel engine (heavy-duty)—tier 2, stage 2	3	
		Industrial diesel engine (heavy-duty)—tier 3, stage 3A	4	
		Light industrial diesel engine	5	
		Marine diesel engine (commercial)	6	
		Marine diesel engine (pleasure)	7	
		On-highway commercial diesel engine (heavy-duty)	8	
		Water pump—centrifugal	9	
		Water pump—jet	10	<b>10</b>
	<b>B. Other general-purpose machinery</b>			
		Air conditioner—residential	11	
		Air conditioner—room	12	
	Rough terrain forklift—extendable boom	13		
	Rough terrain crane	14		
	Telescopic boom truck crane	15	<b>5</b>	
150113.1	<b>SPECIAL-PURPOSE MACHINERY</b>			
	<b>A. Agricultural and forestry machinery</b>			
		Compact tractor	1	
		Utility tractor	2	<b>2</b>
	<b>B. Machine tools</b>			
		MIG welder (arc welder)	3	
		Power circular saw	4	
	Power hand drill	5		
	Grinder power handheld	6		

Basic heading code	Basic heading title	Product name	Product code	No. of products
		Router	7	
		Sander	8	6
	<b>C. Machinery for metallurgy, mining, quarrying, and construction</b>			
		Backhoe loader	9	
		Crawler dozer—large	10	
		Crawler dozer—medium	11	
		Crawler dozer—small	12	
		Crawler loader—large	13	
		Crawler loader—medium	14	
		Crawler loader—small	15	
		Dumper1—rigid frame	16	
		Dumper2—over 30 tonnes	17	
		Dumper3—under 30 tonnes	18	
		Hydraulic excavator1—large	19	
		Hydraulic excavator2—compact	20	
		Hydraulic excavator3—mini	21	
		Motor grader	22	
		Skid steer loader	23	
		Skid steer loader—rubber track	24	
		Trenchless	25	
		Wheel dozer	26	
		Wheel loader1—large	27	
		Wheel loader2—midsize	28	
		Wheel loader3—compact	29	
		Wheel loader4—small	30	22
	<b>D. Machinery for food, beverage, and tobacco processing</b>			
		Mincing machine (0.5 kW power)	31	
		Mincing machine (1 kW power)	32	
		Spiral dough mixer (for 50 kg)	33	
		Spiral dough mixer (for 100 kg)	34	4
	<b>E. Machinery for textile, apparel, and leather production</b>			0
	<b>F. Other special-purpose machinery</b>			
		Blow molding machine for 50 liters	35	
		Blow molding machine for 100 liters	36	
		Injection molding machine for 50 tonnes (low-end)	37	
		Injection molding machine for 1,000 tonnes (high-end)	38	
		Extruder	39	5

(continued)

Basic heading code	Basic heading title	Product name	Product code	No. of products
150114.1	<b>ELECTRICAL AND OPTICAL EQUIPMENT</b>			
	<b>A. Office machinery</b>			
		Copier	1	
		Fax machine	2	
		Digital projector	3	
		Overhead projector	4	
		Paper shredder	5	<b>5</b>
	<b>B. Computers and other information processing equipment</b>			
		Desktop computer—Compaq	6	
		Desktop computer—Dell	7	
		Laptop computer	8	
		Inkjet printer	9	
		Laser printer	10	
		Multifunction printer	11	
		PDA	12	
		Scanner	13	
		Server	14	<b>9</b>
	<b>C. Electrical machinery and apparatus</b>			
		Electric motor	15	
		Generator	16	<b>2</b>
	<b>D. Radio, television, and communications equipment and apparatus</b>			
		2-way radio	17	
		DVD player	18	
		Security camera	19	<b>3</b>
	<b>E. Medical, precision, and optical instruments, watches, and clocks</b>			
		Anesthesia unit	20	
		Chemistry analyzer	21	
		CT scanner	22	
		Infant incubator	23	
		Infusion pump	24	
		Mammography unit	25	
		MRI	26	
		Patient monitor	27	
	Ultrasound	28		
	X-ray machine	29	<b>10</b>	

Basic heading code	Basic heading title	Product name	Product code	No. of products
150115.1	OTHER MANUFACTURED GOODS n.e.c.			0
150121.1	MOTOR VEHICLES, TRAILERS, AND SEMITRAILERS			
		Commercial vehicle—28 passengers	1	
		Diesel minibus—8 passengers	2	
		Diesel minibus—15 passengers	3	
		Diesel minibus—21 passengers	4	
		Intracity bus—26–44 passengers	5	
		Intercity bus—45 passengers	6	
		Lorry cab chassis—5 tonnes	7	
		Lorry cab chassis—10 tonnes	8	
		Lorry cab chassis—15 tonnes	9	
		Pickup truck	10	
		Van truck	11	11
150311.1	SOFTWARE			
		Adobe Photoshop (10)	1	
		Adobe Photoshop (100)	2	
		MS Office 2003 Standard (10)	3	
		MS Office 2003 Standard (100)	4	
		MS Windows XP Professional (10)	5	
		MS Windows XP Professional (100)	6	
		Norton Antivirus (10)	7	
		Norton Antivirus (100)	8	
		SPSS V10	9	9
<b>TOTAL</b>				<b>108</b>

Source: ICP.

## ANNEX B

## Reporting Form, Price Factor Method (PFM)

The reporting form that countries use to implement the PFM asks only for the costs and margins likely to be relatively large and that countries could reasonably be expected to report.

Reporting form for price factor method (PFM)			
Country _____		Currency unit _____	
		Year _____	
Line no.	Description	Metal products and equipment (group 150110.0)	Transport equipment (group 150120.0)
1	C.i.f. value of imports of equipment goods		
2	Customs duties		
3	Nondeductible VAT and other taxes on products: <i>either amount or percentage of line 1</i>	_____ _____%	_____ _____%
4	Transport costs in the importing country <i>either amount or percentage of line 1</i>	_____ _____%	_____ _____%
5	Wholesale and retail trade margins in the importing country <i>either amount or percentage of line 1</i>	_____ _____%	_____ _____%
6	Installation costs <i>either amount or percentage of line 1</i>	_____ _____%	_____ _____%
7	Memorandum items Total imports of goods in c.i.f. values Total insurance and freight on all imports of goods, including those provided by residents as well as nonresidents.	_____ _____	_____ _____

Reporting form completed by: \_\_\_\_\_

Position: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Postal address: \_\_\_\_\_

### Explanatory notes

#### Line 1. C.i.f. Value of Imports of Equipment Goods

The c.i.f. price (i.e., cost, insurance, and freight) is the price of a good delivered at the frontier of the importing country, including any insurance and freight charges incurred to that point but before the payment of any customs duties or other taxes on imports or trade and transport margins within the importing country. C.i.f. is the standard method for valuing merchandise imports, and thus the c.i.f. value of imported equipment goods can be obtained directly from the regular statistics on international merchandise trade.

The imports to be included here are those that form part of gross fixed capital formation (GFCF). Goods that form part of GFCF in equipment goods can be identified using either the SITC (Standard International Trade Classification) or the HS (Harmonized System) classifications of merchandise trade. A few goods, such as motor vehicles and personal computers, are imported both for capital formation and for final consumption by government or households. Imports for final consumption should be excluded. Countries that use some version of the commodity flow method for estimating GFCF will already have a key for assigning codes to GFCF or final consumption.

Note that no breakdown is called for beyond the group level of the ICP expenditure classification. This reporting form asks only for figures for total "metal products and machinery" and total "transport equipment."

**Line 2. Customs Duties**

The amount shown here should be the customs duties *due* on imports, although the amounts *actually paid* will usually be a good approximation and can be reported here. There are two ways in which this item can be estimated—either from records of customs duties collected or by applying the rates of customs duties to the c.i.f. values of imports:

- Most customs authorities classify their receipts according to the Harmonized System. The amounts collected on equipment goods can therefore be obtained by identifying the relevant HS codes. As noted above, it is necessary to distinguish duties collected on goods for GFCF from those collected on goods for the final consumption expenditure. The main problem here will affect motor vehicles, computers, hand tools, and metal furniture. This needs to be considered for these and similar products also purchased by households.
- If a single rate of customs duty is charged for all imports of investment goods, this item can be easily estimated by applying that rate to the value of imports shown in line 1. If different rates apply to different types of equipment goods or to imports from different countries, it will be necessary to calculate a weighted average of these rates using the c.i.f. values of the relevant imports as weights.

**Line 3. Nondeductible Value Added Taxes and Other Taxes on Products**

The amount shown here is the total amount of value added taxes, sales taxes, or other product taxes paid by the final purchaser of the imported item of equipment goods. In some countries, VAT and other product taxes are reimbursed or not charged on goods for GFCF. In such cases, there will be no entry for this item.

**Line 4. Transport Costs in the Importing Country**

These are the costs of transporting equipment goods from where they enter the country to the establishment of the purchaser. Many countries may have information on transport costs from an input-output or supply and use table. Other countries use some form of the commodity flow method to estimate GFCF in equipment goods. Use of this approach requires estimates of transport costs for equipment goods. Other countries will have to estimate the average distance over which imported equipment goods are carried from their point of arrival to the main industrial centers. They will also need estimates of freight rates per ton-kilometer and the tonnage of equipment goods transported.

**Line 5. Retail and Wholesale Trade Margins in the Importing Country**

No distinction is made between wholesale and retail margins.

Trade margins are the gross output of retail and wholesale enterprises. Imported goods are usually traded by large corporate enterprises that will keep standard accounting records. Input-output and supply and use tables are another possible source for some countries.

**Line 6. Installation Costs**

There are usually no installation costs for transport equipment.

For metal products and machinery, the costs of installation should include all costs of putting the item in place, connecting it to the power source, and calibrating and testing the equipment good so that it is functioning correctly. Countries that use some form of the commodity flow method to estimate GFCF in equipment goods will already have estimates of these costs.

**Line 7. C.i.f. Value of Imports of Goods and International Insurance and Freight on All Imports of Goods**

This memorandum item asks for the c.i.f. value of the *total* imports of goods and the *total* costs of international freight and insurance. The first item should be readily available from merchandise trade statistics.

The balance of payments will give the value of insurance and transport services provided by nonresident insurance and transport companies. In many countries, all, or mostly all, international freight and insurance are provided by nonresident companies. In some countries, however, it will be necessary to estimate insurance and freight services provided by resident companies. In the *Standard National Accounts* supply and use table, total international insurance and freight are one of the adjustment items in the supply matrix.

## NOTE

1. For a full description of the methodology for equipment goods, see Eurostat and OECD (2006).

## REFERENCE

Eurostat and OECD (Organisation for Economic Co-operation and Development). 2006. *Eurostat-OECD Methodological Manual on Purchasing Power Parities*. Paris: OECD.

