

**STATISTICAL COMMISSION and  
ECONOMIC COMMISSION FOR EUROPE**

**WORKING PAPER No 4**

**CONFERENCE OF EUROPEAN STATISTICIANS**

**ENGLISH ONLY**

**Joint Consultation on the European Comparison Programme  
(Geneva, 31 March-2 April 2003)**

**ON METHODOLOGICAL ISSUES OF THE INTERNATIONAL COMPARISON  
-OF THE GDP AND PURCHASING POWER PARITIES  
OF THE CIS COUNTRIES AND MONGOLIA FOR 2000**

Submitted by Interstate Statistical Committee of the Commonwealth of Independent States  
and  
State Committee of the Russian Federation on Statistics (GOSKOMSTAT)

## **1. Introduction**

CIS countries and Mongolia has been involved in ICP work since 1993. Current comparison is the continuation of the work commenced in 1994 by Statistics Directorate of the OECD with the support of the CIS Statistical Committee, Goskomstat of Russia, Statistical Institute of Turkey. In connection with financial difficulties this work by the OECD after the comparison for 1996 was terminated.

In 1998 the Council of the Heads of the statistical offices of the CIS countries decided that CIS countries would participate in the next round of international comparisons in the framework of ECP and the functions of coordinators would be carried out by the CIS Statistical Committee and Goskomstat of Russia.

Following 12 countries participate in the international comparison of PPPs and GDP of the CIS countries and Mongolia for 2000: Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Mongolia, Russian Federation, Tajikistan, Turkmenistan and Uzbekistan.

The comparisons for 2000 is carried out with the support of the OECD and the World Bank on the multilateral basis using the unified methodology employed by OECD – Eurostat for comparison for 1999; this methodology reflects major concepts and definitions of SNA93. Thus all conditions are created for incorporating the results of comparisons of PPPs and GDP of the CIS countries in the overall results of ECP.

By the present time five multilateral meetings of experts of the countries-participants were held: in July of 1999 in St.-Petersburg, Russia, the meeting was devoted to discussion of the results of the comparison for 1996 and fundamental methods of organization and methodological issues of the next round of comparisons; in November of 1999 and in April of 2000 the meetings held in Voronovo (Russia) were devoted to discussion of lists of consumer and investment goods chosen as representative items; in October of 2001 the meeting was devoted to price verifications of representative items; in May 2002 the meeting was devoted to discussion preliminary results of comparison.

In November 2002 Council of the Heads of the statistical offices of the CIS countries approved results of comparison and publication of results in 1<sup>st</sup> quarter 2003.

## **2. Methodology of comparison**

### **2.1 GDP Classification**

GDP is the aggregate used frequently to represent the economic size of countries and, on a per capita basis, the economic well being of their residents. It can be estimated using three different approaches which, in theory, yield the same result: the income approach, the production approach and the expenditure approach. However, volume comparisons of GDP can only be made from the production side or the expenditure side. This is because the values of income aggregates, unlike the values of production and expenditure aggregates, cannot be split into meaningful price and volume components which is a prerequisite for making price and volume comparisons of GDP.

CIS and Mongolia comparison as Eurostat-OECD comparisons are made from the expenditure side which identifies the components of final demand: consumption, investment and exports and imports. The reasons for this are: one, the inherent usefulness of making comparisons from the expenditure side; two, the difficulties of organising comparisons from the production side which require data for both intermediate consumption and gross output; and three, the generally better comparability among countries of their detailed breakdowns of final expenditure on GDP. The disadvantage of the expenditure approach is that, although it enables levels and structures of consumption and investment to be compared, productivity comparisons can only be made at the level of the whole economy. Individual industries are

not identified on the expenditure side. In order to compare productivity at the industry level, international comparisons of GDP must be undertaken from the production side

The breakdown of final expenditure on GDP into product groups or *basic headings* provides the framework for the comparison. The basic headings themselves are the building blocks of the comparison. It is at the level of the basic heading that expenditures are defined, products selected, prices collected and edited and PPPs first calculated.

In principle, a basic heading consists of a group of similar well-defined goods or services for which a sample of products can be selected that are both representative of their type and of the purchases made in participating countries. In practice, a basic heading is defined as the lowest level of final expenditure for which explicit expenditure weights can be estimated. Thus, an actual basic heading can cover a broader range of goods or services than is theoretically desirable.

The classification of for CIS and Mongolia comparison 2000 breaks GDP down into six (seven) main aggregates. These are subsequently broken into 31 categories, 73 groups, 143 classes and 179 basic headings. Classification of GDP for CIS countries and Mongolia is similar to classification of the OECD comparison.

- *Individual consumption expenditure by households* was broken down by purpose into 138 basic headings. Expenditure at the basic heading level was defined according to the domestic concept, that is irrespective of whether the household making the purchase was resident or not. Expenditure in the country by non-residents was treated as a single amount and subtracted from the expenditure abroad by resident households to obtain *net purchases abroad*.
- *Individual consumption expenditure by non-profit institutions serving households (NPISHs)* was broken down by purpose into six basic headings: housing, health, recreation and culture, education, social protection and other services (such as religion, political parties, labour and professional organisations and environment protection). By convention national accountants treat all consumption expenditures of NPISHs as individual consumption expenditure. This applies even to expenditures on “other services” which, had they been made by government, would be considered to be collective consumption expenditure.
- Government final consumption expenditure was broken down by purpose and by type of service into *individual consumption expenditure by government* and *collective consumption expenditure by government*. Individual consumption expenditure by government is government expenditure on services which households consume individually (housing, health, recreation and culture, education and social protection); collective consumption expenditure of government is government expenditure on services which benefit households collectively (general public services, defence, public order and safety, economic affairs, environment protection and housing and community services).

Table 1. Main aggregates, expenditure categories and expenditure classes

<p><b>11.00 INDIVIDUAL CONSUMPTION EXPENDITURE BY HOUSEHOLDS</b></p> <p><b>11.01 Food &amp; non-alcoholic beverages</b></p> <p>11 Bread &amp; cereals</p> <p>12 Meat</p> <p>13 Fish &amp; seafood</p> <p>14 Milk, cheese &amp; eggs</p> <p>15 Oil &amp; fats</p> <p>16 Fruit</p> <p>17 Vegetables</p> <p>18 Sugar, jam, honey, chocolate &amp; confectionery</p> <p>19 Food products n.e.c.</p> <p>21 Coffee, tea &amp; cocoa</p> <p>22 Mineral waters, soft drinks, fruit &amp; vegetable juices</p> <p><b>11.02 Alcoholic beverages, tobacco &amp; narcotics</b></p> <p>11 Spirits</p> <p>12 Wine</p> <p>13 Beer</p> <p>21 Tobacco</p> <p>31 Narcotics</p> <p><b>11.03 Clothing &amp; footwear</b></p> <p>11 Clothing materials</p> <p>12 Garments</p> <p>13 Other articles of clothing &amp; clothing accessories</p> <p>14 Cleaning, repair &amp; hire of clothing</p> <p>21 Shoes &amp; other footwear</p> <p>22 Repair &amp; hire of footwear</p> <p><b>11.04 Housing, water, electricity, gas &amp; other fuels</b></p> <p>11 Actual rentals paid by tenants</p> <p>21 Imputed rentals of owner-occupiers</p> <p>31 Materials for maintenance &amp; repair of the dwelling</p> <p>32 Services for maintenance &amp; repair of the dwelling</p> <p>41 Water supply</p> <p>44 Miscellaneous services relating to the dwelling</p> <p>51 Electricity</p> <p>52 Gas</p> <p>53 Liquid fuels</p> <p>54 Solid fuels</p> <p>55 Heat energy</p> <p><b>11.05 Furnishings, household equipment &amp; routine Household maintenance</b></p> <p>11 Furniture &amp; furnishings</p> <p>12 Carpets &amp; other floor coverings</p> <p>13 Repair of furniture, furnishings &amp; floor coverings</p> <p>21 Household textiles</p> <p>31 Major household appliances whether electric or not</p> <p>32 Small electric household appliances</p> <p>33 Repair of household appliances</p> <p>41 Glassware, tableware &amp; household utensils</p> <p>51 Major tools &amp; equipment</p> <p>52 Small tools &amp; miscellaneous accessories</p> <p>61 Non-durable household goods</p> <p>62 Domestic services &amp; household services</p>	<p><b>11.06 Health</b></p> <p>11 Pharmaceutical products</p> <p>12 Other medical products</p> <p>13 Therapeutic appliances &amp; equipment</p> <p>21 Outpatient medical services</p> <p>22 Outpatient dental services</p> <p>23 Outpatient paramedical services</p> <p>31 Hospital services</p> <p><b>11.07 Transport</b></p> <p>11 Motor cars</p> <p>12 Motor cycles &amp; bicycles</p> <p>13 Animal drawn vehicles</p> <p>21 Parts &amp; accessories for personal transport equip.</p> <p>22 Fuels &amp; lubricants for personal transport equip.</p> <p>23 Maintenance &amp; repair of personal transport equip.</p> <p>24 Other services for personal transport equip.</p> <p>31 Passenger transport by railway</p> <p>32 Passenger transport by road</p> <p>33 Passenger transport by air &amp; sea</p> <p>34 Combined passenger transport</p> <p>36 Other purchased transport services</p> <p><b>11.08 Communication</b></p> <p>11 Postal services</p> <p>21 Telephone &amp; telefax equipment</p> <p>31 Telephone &amp; telefax services</p> <p><b>11.09 Recreation &amp; culture</b></p> <p>11 Equipment for the reception, recording &amp; reproduction of sound &amp; pictures</p> <p>12 Photographic &amp; cinematographic equipment &amp; optical instrument</p> <p>13 Information processing equipment</p> <p>14 Recording media</p> <p>15 Repair of audio-visual, photographic &amp; information processing equipment</p> <p>21 Other major durables for recreation &amp; culture</p> <p>23 Maintenance &amp; repair of other major durables</p> <p>31 Games, toys &amp; hobbies</p> <p>32 Equip. for sport, camping &amp; outdoor recreation</p> <p>33 Gardens, plants &amp; flowers</p> <p>34 Pets &amp; related products</p> <p>35 Veterinary &amp; other services for pets</p> <p>41 Recreational &amp; sporting services</p> <p>42 Cultural services</p> <p>43 Games of chance</p> <p>51 Books</p> <p>52 Newspapers, periodicals &amp; other printed matter</p> <p>54 Stationery &amp; drawing materials</p> <p>61 Package holidays</p> <p><b>11.10 Education</b></p> <p>11 Education definable by level</p> <p>21 Education not definable by level</p> <p><b>11.11 Restaurants &amp; hotels</b></p> <p>11 Restaurants, cafés &amp; the like</p> <p>12 Canteens</p> <p>21 Accommodation services</p>
---	---

Table 1. Main aggregates, expenditure categories and expenditure classes (contd.)

<p><b>11.12 Miscellaneous goods &amp; services</b>            11 Hairdressing &amp; personal grooming establishments            12 Electrical appliances for personal care            13 Other articles &amp; products for personal care            21 Prostitution            31 Jewellery, clocks &amp; watches            32 Other personal effects            41 Social protection            51 Insurance            61 FISIM            62 Other financial services n.e.c.            71 Other services n.e.c.</p>	<p><b>14.00 COLLECTIVE CONSUMPTION EXPENDITURE BY GOVERNMENT</b></p> <p><b>14.01 Collective services</b>            11 Compensation of employees            21 Intermediate consumption            31 Consumption of gross fixed capital formation            41 Net taxes on production            51 Receipts from sales</p> <p><b>15.00 GROSS FIXED CAPITAL FORMATION</b></p> <p><b>15.01 Machinery &amp; equipment</b>            11 Fabricated metal products, except machinery &amp; Equipment General purpose machinery Special purpose machinery            21 Electrical &amp; optical equipment            31 Other manufactured goods n.e.c.            41 Road transport equipment</p> <p><b>15.02 Construction</b>            11 Residential buildings            12 Renovation of residential buildings            21 Non-residential buildings            22 Renovation of non-residential buildings            31 Civil engineering</p> <p><b>15.03 Other products</b>            11 Products of agriculture, forestry, fisheries &amp; Agriculture            12 Software            13 Other products n.e.c.</p> <p><b>16.00 CHANGE IN INVENTORIES &amp; ACQUISITIONS LESS DISPOSALS OF VALUABLES</b></p> <p><b>16.01 Change in inventories</b>            11 Change in inventories</p> <p><b>16.02 Acquisitions less disposals of valuables</b>            11 Acquisitions less disposals of valuables</p> <p><b>17.00 BALANCE OF EXPORTS &amp; IMPORTS</b></p> <p><b>17.01 Balance of exports &amp; imports</b>            11 Balance of exports &amp; imports</p>
<p><b>11.13 Net purchases abroad</b>            11 Net purchase abroad</p>	
<p><b>12.00 INDIVIDUAL CONSUMPTION EXPENDITURE BY NPISHS</b></p> <p><b>12.01 Individual consumption expenditure by NPISHs</b>            11 Housing            21 Health            31 Recreation &amp; culture            41 Education            51 Social protection            61 Other services</p>	
<p><b>13.00 INDIVIDUAL CONSUMPTION EXPENDITURE BY GOVERNMENT</b></p> <p><b>13.01 Housing</b>            11 Housing</p> <p><b>13.02 Health</b>  <i>Health benefits &amp; reimbursements</i>            11 Health benefits &amp; reimbursements  <i>Production of health services</i>            21 Compensation of employees            22 Intermediate consumption            23 Consumption of gross fixed capital formation            24 Net taxes on production            25 Receipts from sales</p> <p><b>13.03 Recreation &amp; culture</b>            11 Recreation &amp; culture</p> <p><b>13.04 Education</b>  <i>Education benefits &amp; reimbursements</i>            11 Education benefits &amp; reimbursements  <i>Production of education services</i>            21 Compensation of employees            22 Intermediate consumption            23 Consumption of gross fixed capital formation            24 Net taxes on production            25 Receipts from sales</p> <p><b>13.05 Social protection</b>            11 Social protection</p>	

- *Individual consumption expenditure by government* was broken down into 15 basic headings. First, by purpose - housing, health, recreation and culture, education, social protection - and then, in the case of health and education, by whether the expenditure was for the purchase of health or education services from the private sector or for the production of health and education services by government itself. The expenditure on government-produced services were broken down further by cost components: compensation of employees, intermediate consumption, consumption of fixed capital formation, net taxes on production and receipts from sales.
- *Collective consumption expenditure by government* was broken down by cost components into five basic headings: compensation of employees, intermediate consumption, consumption of fixed capital formation, net taxes on production and receipts from sales.
- *Gross fixed capital formation* was broken down by type of product into 12 basic headings: one for products of agriculture, forestry, fisheries and aquaculture, eighteen for machinery and equipment, eleven for construction, one for computer software and one for other products n.e.c. (land improvement, mineral exploration and other intangible fixed assets).
- *Change in inventories, acquisitions less disposals of valuables and balance of exports and imports* were treated as three basic headings and not broken down further.

#### ***Actual individual consumption***

The breakdown of final consumption expenditure in Table 1 is structured by who pays - households, NPISHs or government. However, the detailed results of the comparison are presented by type of consumption - individual or collective - that is by who consumes - households or government. Hence the aggregates *actual individual consumption* (by households) and *actual collective consumption* (by government) in the tables following the text.

*Actual individual consumption* is the sum of the individual consumption expenditures of households, NPISHs and government. As can be seen from Table 1, the individual consumption expenditures of NPISHs and government are broken down so that they can be added to their counterpart expenditures under household expenditure. The transfer of government and NPISHs expenditures on individual services to household expenditure has long been a feature of international volume comparisons. It is necessary because of the various ways individual services are financed in different countries. If it is not made, households in countries where government and/or NPISHs directly provide individual services will appear to consume a smaller volume of goods and services than households in countries where households themselves pay directly for these services.

*Actual collective consumption* is the same as collective consumption expenditure by government as defined above under *Classifications of Expenditures*.

#### ***Classification by type of product***

This classification first distinguishes between final expenditure on goods and final expenditure on services. Final expenditure on goods is divided between consumer goods and capital goods with expenditure on consumer goods being broken down into expenditure on non-durable goods, expenditure on semi-durable goods and expenditure on durable goods. Final expenditure on services is divided between consumer services and government services

with expenditure on government services being broken into expenditure on collective services and expenditure on individual services.

The distinction between non-durable goods and durable goods is based on whether the goods can be used only once or whether they can be used repeatedly or continuously over a period of considerably more than one year. Moreover, durable goods have a relatively high purchasers' price. Semi-durable goods differ from durable goods in that their expected lifetime of use, though more than one year, is often significantly shorter and that their purchasers' price is substantially less. The distinction between collective services and individual services is explained in the previous section.

The classification by type of product was made at the level of the basic heading. For government services and capital goods, this was straightforward; for consumer goods and services it was not always so. Most basic headings comprising private final consumption expenditure could be classified as containing either goods or services but, for practical reasons, some basic headings contained both goods and services. Similarly, there were basic headings that contained either both non-durable and semi-durable goods or both semi-durable and durable goods. These basic headings were classified according to which type of product was considered to be predominant.

#### ***Missing PPPs and reference PPPs***

There were a number of basic headings for which PPPs could not be calculated for a country. No direct binary PPP could be calculated between the country and any other country. In such cases, the PPPs for the countries and basic headings were taken either from a comparable basic heading - such as beef for veal - or from the next level of aggregation - such as meat for pork.

For a number of basic headings no prices were collected. PPPs for these basic headings had to be obtained from elsewhere. The PPPs used in these cases are described as "reference PPPs". The basic headings affected and the reference PPPs selected for them after consultation with participating countries is listed in Table 2. It will be seen that the reference PPPs are either for highly aggregated expenditure components, such as household final consumption expenditure, or for goods and services that are similar to the goods and services for which no prices were collected.

Table 2. **Basic headings for which no prices were collected and their reference PPPs**

<b>BH without price data</b>		<b>Reference Heading</b>	<b>Reference Heading</b>
BH code	Name	Code of Aggregate (BH)	Name of Aggregate (BH)
11.02.31.1	Narcotics	(11.02.21.1 *11.06.11.1)^0.5	Tobacco and pharmaceutical products
11.04.11.1	Actual rents		Indirect PPP by Quantity approach
11.04.21.1	Imputed rents		Indirect PPP by Quantity approach
11.07.14.1	Animal vehicle	11.07.12.1	<b>11.07.12.1 only</b> as more simple (partly / mostly domestic) products (Motobikes and bicycles)
11.07.36.1	Other transport services	11.07.30.0 (w/o 11.07.36.1)	Transport Services - Hierarchical
11.09.23.1	Repair of major durables for outdoor (and indoor - ?) recreation	11.09.15.1	<b>11.07.23.1</b> "Maintenance and repair of personal transport equipment"
11.09.43.1	Games of chance		<b>Individual Market Consumption (IMC)</b> - Final Cons.Exp. of HH (w/o BHs with ref. PPPs and Rents)
11.09.61.1	Packaging tours	(11.07.30.0 * 11.11.00.0)^0.5	Transport Services & Hotels, restaurants, cafe
11.12.21.1	Prostitution	11.00.00.0	<b>Individual Market Consumption (IMC)</b> - Final Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents)
11.12.41.1	Social welfare	11.00.00.0	<b>Individual Market Consumption (IMC)</b> - Final Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents)
11.12.51.1	Insurance	11.12.62.1	<b>Individual Market Consumption (IMC)</b> - Final Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents)
11.12.61.1	FISIM	11.12.62.1	<b>Individual Market Consumption (IMC)</b> - Final Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents)
11.13.11.1	Net purchases abroad	Annual Exchange Rate "Nat.Curr. / RUR)	
12.01.11.1	Housing - NPISH	11.04.00.0	<b>Indirect PPP by Quantity approach</b> as for 11.04.11.1 and 11.04.21.1
12.02.11.1	Health - NPISH	11.06.00.0	Average of "Health-HH" together with "Hospitals-GG w/o Receipts" ( <b>11.06.00.0 + 13.02.20.0</b> )
12.03.11.1	Culture and recreation - NPISH	11.09.40.0	Non-hierarchical / the same as in GG: Average of Cultural Services in HH (11.09.40.0) and Individual Consumption by GG- Education (w/o "Receipts from sales")
12.04.11.1	Education - HPISH	11.10.00.0	<b>"Education-GG" (13.04.20.0)</b>
12.05.11.1	Social welfare - NPISH	11.06.00.0	"Hospitals-HH" together with "Hospitals-GG w/o Receipts" = ( <b>11.06.31.1 + 13.02.20.0</b> )
12.06.11.1	Other services - NPISH	13.00.00.0	hierarchical PPP from all other NPISH: ( <b>12.01.11.1 : 12.05.11.1</b> )
13.01.11.1	Housing - GG	11.04.00.0	<b>Indirect PPP by Quantity approach</b> as for 11.04.11.1 and 11.04.21.1
13.02.11.1	Reimbursements from GG to HH -Health	11.06.00.0	Health in HH
13.02.22.1	Intermediate Consumption in Hospitals - GG	(11.00.00.0 * 15.00.00.0)^0.5	<b>Individual Market Consumption (IMC)</b> - Fin. Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents).
13.02.23.1	Consumption of fixed capital in Hospitals - GG	15.00.00.0	GFCF
13.02.24.1	Net taxes on production in Hospitals - GG	13.02.20.0 (w/o 13.02.24.1 and 13.02.25.1)	<b>an average EKS-PPP (13.02.21.1 : 13.02.23.1)</b>
13.02.25.1	Receipts from sales	13.02.20.0 (w/o 13.02.25.1)	<b>average EKS-PPP</b> (hierarchical by two-stage procedure) = ( <b>13.02.21.1 : 13.02.24.1</b> )
13.03.11.1	Recreation and Culture - GG	13.00.00.0	Non-hierarchical / the same as in NPISH: Average of Cultural Services in HH (11.09.40.0) and Individual Consumption by GG Education (w/o "Receipts from sales")
13.04.11.1	Reimbursements from GG to HH -Education	11.10.00.0	Education in HH
13.04.22.1	Intermediate Consumption in Education - GG	(11.00.00.0 * 15.00.00.0)^0.5	<b>Individual Market Consumption (IMC)</b> - Fin. Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents).

13.04.23.1	Consumption of fixed capital in Education - GG	15.00.00.0	GFCF
13.04.24.1	Net taxes on production in Education - GG	13.04.20.0	<b>an average EKS-PPP (13.04.21.1 : 13.04.23.1)</b>
13.04.25.1	Education - Receipts from sales	13.04.20.0	<b>an average EKS-PPP (hierarchical by two-stage procedure) = (13.04.21.1 : 13.04.24.1)</b>
13.05.11.1	Social welfare - GG	13.00.00.0	"Hospitals-HH" together with "Hospitals-GG w/o Receipts" = <b>(11.06.31.1 + 13.02.20.0)</b>
14.01.21.1	Intermediate Consumption in Collective Services - GG	(11.00.00.0 * 15.00.00.0) <sup>0.5</sup>	<b>Individual Market Consumption (IMC) - Fin. Cons. Exp. of HH (w/o BHs with ref. PPPs and Rents).</b>
14.01.31.1	Consumption of fixed capital in Collective Services - GG	15.00.00.0	GFCF
14.01.41.1	Net taxes on production in Coll.Serv. - GG	14.01.00.0	More exactly <b>an average EKS-PPP = (14.01.11.1 : 14.01.31.1)</b>
14.01.51.1	GG - Receipts from sales	14.01.00.0	<b>average EKS-PPP (hierarchical by two-stage procedure) = (14.01.11.1 : 14.01.41.1)</b>
15.02.12.1	Reconstruction of residential buildings	15.02.11.1	PPP for "Residential buildings"
15.02.22.1	Reconstruction of non-residential buildings	15.02.21.1	PPP for "Non-Residential buildings"
15.03.11.1	Products of agriculture, forest, fishery, etc.	15.00.00.0 (w/o 15.03.00.30)	GFCF- Hierarchical
15.03.12.1	Software	15.00.00.0 (w/o 15.03.00.30)	GFCF- Hierarchical
15.03.13.1	Other products	15.00.00.0 (w/o 15.03.00.30)	GFCF- Hierarchical
16.01.11.1	Changes in Inventories	"Consumer goods" and GFCF	<b>Consumer Goods (HH) and "Producer Durables - 15.01.00.0" (GFCF).</b> "Construction" and "Other products" should be excluded
16.02.11.1	Valuables (net)	11.12.31.1	Jewellery, clocks, etc
17.01.11.1	Net exports of goods and services	Annual Exchange Rate "Nat.Curr. / RUR)	

## 2.2 Data requirements

The calculation of PPPs from the expenditure side requires each country participating in the comparison to provide a set of national annual prices, that is prices that have been averaged both over the regions of the country and over the months or quarters of the year, and a breakdown of national expenditures.

The prices should be for a selection of products chosen from a common basket of goods and services; the national expenditure should be broken down by product group according to a common classification. Both prices and detailed expenditures should refer to the year of the comparison and both should cover the whole range of goods and services included in final expenditure on GDP.

The prices are used to derive price relatives at the product level and then PPPs at the product group level, while the expenditures are used as weights with which to obtain PPPs at the various levels of aggregation above the product group level. Subsequently, the PPPs are used to convert the national expenditures in national currencies into real expenditures in a common currency. For this reason, the prices supplied by countries must be for items that are *representative* of their final expenditure on GDP and are *comparable* between countries, while the prices themselves should be *consistent* with the methods of valuation used to

estimate the expenditures. In most cases this means they should be market or purchasers' prices.

Failure to observe any of these three requirements will result in either an overestimation or underestimation of price levels and, consequently, an underestimation or overestimation of volumes:

- *Representativeness*: As there is an inverse relationship between prices and quantities, a comparison based on products that are not equally representative of all countries will result in biased price relatives. Price levels for countries having a smaller number of representative products will be overestimated, while price levels for countries with a larger number of representative products will be underestimated.

- *Comparability*: A comparison must be made using products that are comparable. Price relatives should be based on products whose quality and quantity are the same across countries. If not, differences in quality or quantity will be mistaken for price differences and will lead to the underestimation or overestimation of price levels.

- *Consistency*: The basis of a comparison is the identity:  $\text{Expenditure} = \text{Price} \times \text{Volume}$ . Volumes are obtained by dividing expenditures by prices. If the volumes are to be estimated correctly, then the prices collected should be those used to derive the expenditures. Using prices that are not consistent with those underlying the expenditure values will result in volumes being underestimated or overestimated. For CIS countries and Mongolia and for developing countries collected prices should include prices used for own consumption expenditure estimates. The share of own consumption expenditure in individual consumption in developing countries is particularly large. In whole it depends on quality of SNA work in countries.

The requirements of representativeness and comparability are not complementary. Different products are representative of final expenditures in different countries so that products that are strictly comparable across the countries will not be equally representative. CIS comparisons as Eurostat-OECD comparisons employ methods for selecting products and for calculating PPPs that are designed to respect both requirements called asterisk (\*) method.

### **2.3 Non-Market services including rents**

Breaking down government expenditure on the production of collective services, health services and education services by cost component is also a long-standing feature of international comparisons. Such services are termed "non-market services" because either they are not marketed or they are sold at prices that do not cover their cost of production. By convention, national accountants obtain expenditure on non-market services by summing the costs of the inputs required to produce them. PPPs for non-market services are based on input prices with separate PPPs being calculated for compensation of employees, intermediate consumption and consumption of fixed capital. This approach is called "the input-price approach" and it is consistent with the prices underlying the estimated expenditure on non-market services in the national accounts.

The quantity approach as applied to rents requires quantitative data - number of dwellings and useable surface by size of dwelling - and qualitative data - number of dwellings with various facilities (electricity, running water, inside toilet and central heating). The quantitative data are used to calculate an indicator of physical quantity and the qualitative data are used to calculate an indicator of quality. The quantity indicator and the quality indicator are then combined to obtain a volume indicator. The quantity indicator is constructed using the data on useable surface by size of dwelling. Size is defined by number of rooms per dwelling.

## 2.4 Comparison in construction

In CIS and Mongolia comparisons is applied other possible method of construction comparisons called as a method of resource-technological models.

This method on the basis of materials prices most corresponds to actual information capabilities of countries. The main advantage of this method is, that for its use, there is a developed information base. In all the CIS countries, the reference guides (reports, price lists) of prices for concrete materials, intermediate products, items and designs used in construction are published.

Statistical background for PPP calculation is price observation for materials and data from statistical reports about wages and cost distribution of construction works.

The main method of resource technology of PPP calculation is the desaggregation of set of resources, used in construction, on technologically - homogeneous groups.

At usage of a method the statistical hypothesis will be used that prices for materials of homogeneous group (class) under influencing of inflation factors change to the same extent; to proceed from that change of prices captured on one or several materials within homogeneous group, is diffused to all this group.

The model of building site is the aggregated set of resources, which one characterizes costs of works for building of this site. Volume of use of materials and labour is determined and fixed for each type of building site.

At model of building site not less than 85 % materials by cost is described as separate concrete materials grouped by homogeneous groups. Materials, which are not included in the item list, are counted as "other materials" with fixing of their share in total value of materials covered by item list.

For calculation of price of building sites need information such as:

- a) Average prices for materials and 3 items of fuel and energy resources;
- b) Wages in construction (Z);
- c) Indicators of services in construction and other financial indicators important for formation of the price of building site in percentage of the wage, calculated from statistical reports about cost distribution:
  - Social contribution (S),
  - Depreciation (A),
  - Other costs in the cost price (B),
    - Profit in building (P),
- d) Engineering (I),
- e) Value-added tax (VAT).

There are standard materials in models of building sites. Specifications of standard materials, same as specifications of consumer items and machinery and equipment for ICP, has been prepared as item list. If during price observation for materials price for standard material is absent, a country give a detailed specification for priced item. In this case, imputed price of standard material will be determined as:

$$P_s = \frac{P_i}{K_d}$$

Where

$P_s$  – imputed price of standard material in class j;

$P_i$  - registered price of material i in class j;

$K_d$  - coefficient denominator by specifications of material i to standard material in class j.

The calculation of the cost on types of use of technological model is made as follows:

- year average national price of items of class j ( $P_{mj}$ ) and fuel resources ( $P_{ej}$ ) are

multiplied by volumes of their application ( $Q_{Mj}$  and  $Q_{ej}$ ), indicated in model;

- Cost of work-day indicated in model are multiplied for wage (F)

Price of building site calculated as

$$P_{mk} = \left[ \left( 1 + \frac{a}{100} \right) \sum_{j=1}^m P_{MJ} Q_{MJ} + \sum_{k=1}^l P_{ej} Q_{ej} + W * F * \left( 1 + \frac{S + A + B + P}{100} \right) \right] * I * \text{VAT} ,$$

Where

$P_k$  – price of k building site

m – number of homogeneous groups of materials ;

a – share of other materials;

l - number of homogeneous groups of power resources;

$Q_{Mj}$ ,  $Q_{ej}$  – volumes of use of materials and fuel in model k;

F – volume of work-day in model k;

W - the wage for 1 work-day;

S, A, B, P - financial indicators, accordingly on:

- Social contribution (S),

- Depreciation (A),

- Other costs in the cost price (B),

- Profit in building (P),

I - Engineering (design and prospecting activities, technical advice, control of the project and other service),

VAT- Value-added tax.

Now it studies an expediency of use depreciation and other costs to wages for calculation the cost of building site

The price of import materials the ex - building site include the customs cost for date of acceptance of the cargo customs declaration to customs design; customs payments; miscellaneous costs on purchase, transportation, insurance payments, percent for the credit on loans of bank, warehouse charges, the cost of handlings, commissions of reward to the messengers, the consumptions on implementation.

Allowing, that the international comparisons implement within the framework of the concept of GDP and its components of expenditures, the prices of building objects should be final consumer costs. Thus price of model should include value-added tax, the prices of materials does not include value-added tax.

All item list for conducting CIS and Mongolia comparison is divided into 4 questionnaires for construction (named C1- CM), three of them is questionnaires for residential, non-residential buildings and civil engineering works and the forth for various types of building sites.

The questionnaires for three types of construction contain the information on prices for materials and wages and indicators of services in construction and some financial indicators needed for price calculation of building sites.

There are 101 types of standardized materials and 7 indicators of services in construction and financial indicators important for price formation of building sites.

Specifications of standardized materials has been developed and sent them to each participating countries. It is also required to price at least one item in each class of materials.

Thus, countries send the information only about materials stuffs, some financial indicators and representativity of types of building sites, that considerably reduces labour input at conducting comparisons of the aggregate "Construction".

The used methodology provides a transparency, data control, and comparability between countries and increases representativeness by taking into account miscellaneous types of building sites.

## 2.5 Method of aggregation of results

For obtaining comparison results for CIS and Mongolia comparison the EKS method applied. The basic point of the EKS method is calculation of bilateral PPPs (Laspeyres and Paasche with a further averaging by Fisher's formula). For each pair of countries, the basic heading parities are weighted and averaged using first the expenditure structure of the first country as weights and then the corresponding expenditure structure of the second country. Laspeyres and Paasche PPPs are thus calculated. Laspeyres-PPP can be interpreted as an arithmetic mean from particular PPPs with weights of base country and Paasche-PPPs can be interpreted as a harmonic mean from particular PPPs with weights of counterpart country. The geometric mean of these PPPs produces a Fisher PPP between the two countries. These calculations yield matrices of intransitive Fisher PPPs for each heading of each level of aggregation. To make the matrices transitive, the EKS procedure is applied.

The EKS method provides PPPs for each pair of countries in the comparison that are close to the PPPs that would be obtained if each pair of countries had been compared separately. This is because the EKS procedure in making the Fisher PPPs transitive minimises the differences between them and the resulting EKS PPPs. It also provides real expenditures that are not additive. The real expenditures, however, are not subject to the *Gerschenkron effect*.

The Gerschenkron effect applies to aggregation methods that use either a reference price structure or a reference volume structure to compare countries. For methods employing a reference price structure, a country's share of total GDP (that is the total for the group of countries being compared) will rise as the reference price structure becomes less characteristic of its own price structure. For methods employing a reference volume structure, a country's share of total GDP will fall as the reference volume structure becomes less characteristic of its own volume structure. The Gerschenkron effect arises because of the negative correlation between prices and volumes. In other words, expenditure patterns change in response to changes in relative prices because consumers switch their expenditure towards relatively cheap products. The EKS method does not use either a reference price structure or a reference volume structure when estimating real expenditures.

## 2.6 Fixity

The relative position of countries can change as the composition of the group of countries being compared changes. For users are important to have only one set of results as the official results for the Commonwealth of Independent States. CIS Statcommittee and Goskomstat of Russia as Eurostat and the OECD have therefore agreed that the official results for CIS countries will remain unchanged when these countries are included in comparisons with a wider group of countries. This is referred to as the "fixity convention". The published results of the 2000 comparison comply with the fixity requirement. Obtaining fixity involved:

The EKS calculation described above generated PPPs and real expenditures for individual countries. It did not provide PPPs and real expenditures for the two groups of countries covered in the tables to the report. These two groups are CIS11, and CIS11+Mongolia. The PPPs and real expenditures for these two groups of countries were derived using the PPPs and real expenditures of their constituent countries. Before doing this, it was necessary to nominate a currency for each group. The Russian ruble was selected for CIS11 and CIS11+ Mongolia. It was also necessary to designate a reference country and the Russian Federation was chosen. It should be noted that neither the choice of currencies nor the choice of reference country affect the final results.

## 3. Software

The OECD informed the Statistics Austria on intention to use in comparison of GDP of the CIS countries the same software, which is employed by Eurostat. This request was addressed to Statistics Austria since the Austria is the country-leader in the framework of the comparison carried out by Eurostat and accumulated considerable experience in preparation of the software for the international comparisons.

The software in question is effectively used by Eurostat as well as in countries-leaders and in countries-participants (31 countries).

In order to obtain official permission on the use of the above software in the CIS comparisons the OECD discussed this topic with the Eurostat. The latter agreed that this software could be used in CIS comparisons and informed that further questions should be resolved by direct contact between Goskomstat of Russia and Statistics Austria. In accordance with the agreement between the CIS Statistical Committee and Goskomstat of Russia all calculations associated with the comparisons are to be carried out by Goskomstat of Russia. The consultations between the experts of Goskomstat of Russia and Statistics Austria on matters pertaining to use the software for obtaining results of comparisons were held. These consultations and some modification of the software needed for adaptation to the CIS comparisons will continue.

For successful use of the software during the first half of 2001 individual bilateral consultations of the experts of the CIS Statcommittee and Goskomstat of Russia with the experts of statistical services of Azerbaijan, Armenia, Georgia, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan and Mongolia were held.

VBA programme was written on the standard English version of the VBA. Therefore this program must run without problems in all operating Windows systems and in all versions of EXCEL (since EXCEL 5.0) with correctly installed VBA tools/library. This software consist of three parts:

1. Individual country prices' checking (install in participating countries)
2. PPP calculation and formation of diagnostic tables (install in coordinator of regional comparison).
3. Calculation of aggregated results (install in coordinator of regional comparison).

The calculation of reliable PPPs at the basic heading level on the basis of countries' price reports on items is the crucial step to the quality of the comparison in general. Therefore simultaneously with calculation of EKS-PPPs for each basic heading so-called diagnostic or Quaranta tables are calculated. This table provides the main diagnostic tool for checking price data across all participating countries.

The final PPP calculations at the basic heading level are carried out on the basis of average annual national prices for all countries involved in the CIS and Mongolia comparison (12 countries). For price checking is scheduled to prepare three rounds of PPP calculations.

A price matrix is created for each basic heading. Price data are added with an indication of their representativity (so called asterisks - \*). According to the general rule the items non-characteristic for both countries (without \* in both countries) are not included in the calculation for this pair of countries at all. To obtain the equi-characteristicity of the composite item set of underlying basic heading it uses a two-stage procedure.

On the first stage two parities are calculated for each pair of countries (named numerator country and denominator country):

The simple geometric mean (parity of Fisher-type) of these two parities (Laspeyres and Paasche) is calculated at the second stage of calculation. This indicator can be regarded as a PPP for a composite item set equi-characteristic of two countries because even if one country selects many more products characteristic of its consumption than another, the two-

stage procedure used for calculation helps to eliminate the influence of this difference on the final result:

If there is no overlapping of price data for given pair of countries then either Paasche-PPP or Laspeyres-PPP (or both) cannot be calculated and as consequence Fisher-PPP also. In this case the missing F-PPPs are estimated as simple geometric mean from all available indirect F-PPPs (via third countries). These calculations yield in general case the complete matrices of intransitive Fisher PPPs for each basic heading.

To make the matrices of Fisher PPPs transitive, the EKS procedure is applied.

The EKS method utilizes all available direct and indirect (via linking countries) indices. So, the EKS PPP between any two countries is the geometric average of the direct PPP between these countries and all possible indirect (via bridge-countries) PPPs, in which the direct PPP is given twice the weight of each indirect PPP. In other words, the EKS parity is the weighted geometric mean of direct parity and all indirect parities that can be computed from data on the rest of countries (the direct parity getting a weight of 2 and each indirect parity getting a weight of 1).

A square matrix of transitive PPPs "Country h/Country j" (for each pair of countries) is obtained by the EKS-procedure for each basic heading. Due to the transitivity of the EKS-PPPs it is possible to use the EKS-PPPs to any arbitrary country selected as base (this operation is an invariant procedure, i.e. does not change relations between countries and therefore is absolutely neutral).

However, it is not always desirable to use a concrete country (or concrete currency) as base due to bureaucratic (political) and also some practical reasons (e.g. the use of reference PPPs for missing PPPs). Therefore an imaginary "average" neutral unit (numeraire) is used in CIS and Mongolia comparison to present of the results of Surveys (PPPs and related indicators) at the basic heading level.

Simultaneously with calculation of EKS-PPPs for each basic heading so-called the "Quaranta table" is calculated. This table provides the main diagnostic tools for checking price data across all participating countries.

Basic headings with high PPP-variation (conventional crucial value is 33%) are interpreted as "dubious" basic headings for the given country. They have to be carefully examined in first line by the experts of the respective countries item by item.

Data for items marked with the symbol ">" or "<" should be checked by the experts of respective countries once more in the following directions:

- a) technical errors (incorrect quantity, decimal points, etc.)
- b) price quotations and calculation of average price
- c) comparability with initial description in item list
- d) characteristicity (attribution of "\*").

The VBA programme for calculating the basic heading PPPs with producing of the "Quaranta" tables has a set of options: selection of given set of countries or given concrete heading, selection of the aggregated level, selection of the versions of calculation, etc.

The PPPs within the CIS 2000 comparison are calculated in three stages:

First, item price data collected are logically and numerically checked, averaged and then used to derive inter-country price relatives for individual goods and services (individual PPPs).

Second, the individual PPPs are averaged within the EKS procedure (as a rule without weighting but with the use of indication of characteristicity of individual products - so called "asterisks \* " method) to obtain PPPs for basic headings.

Third, the basic heading PPPs are aggregated using national expenditure weights to arrive at weighted PPPs (EKS procedure) for each level of aggregation up to the level of GDP.

The calculation of the EKS-PPPs is made autonomously (independently) for each heading of each aggregated level up to GDP level.

#### **4. Product selection and Price verification of 2000 CIS and Mongolia comparison**

The common basket of goods and services used for the 2000 comparison was made up of product lists detailing the different types of goods and services to be priced. This item list was established by Goskomstat of Russia in consultation with the countries participating in the comparison. Basically, this involved updating the product lists used for the previous comparison and OECD- Eurostat comparison 1999. Specifications for out-of-date products were removed, specifications for new products were added and specifications for many of the retained products were redefined. During this process:

- It was important that the item list for the 2000 comparison was as “equally representative” for them as for the other participants. As explained earlier, differences in the relative representativeness of the product lists lead to overestimation or underestimation of price levels and the corresponding underestimation or overestimation of volumes. However, the method employed to calculate PPPs at the basic heading level in CIS- Mongolia comparison does not require there to be the same number of representative products for each country. Instead “equi-representativeness” is achieved by ensuring that each country participating in the comparison could price at least one representative product per basic heading. Hence, for each basic heading, each participating country was required to nominate and define at least one product that is purchased sufficiently frequently for it to be considered “representative” of both the country’s expenditure on the basic heading and the country’s price level for the basic heading. To be included in the final selection, however, each product nominated had to be accepted for pricing by at least one other participating country and preferably by a country where the product, if not representative, was at least sold in large quantities.

- Care was taken to ensure that the products selected for the basket were commonly found in as many participating countries as possible, but selected products did not have to be available in *all* participating countries. In other words, it was not necessary for all countries to price all products in the basket; they were required to price only their own products and a selection of the products nominated by other countries. This is because at the level of the basic heading CIS and Mongolia comparison as well as Eurostat-OECD comparisons employ “graduality”. In temporal comparisons of prices and expenditures, it is generally accepted that two periods which are a long way apart should not be compared directly but indirectly through intermediate periods. Similarly, in spatial comparisons covering countries with widely different price structures and expenditure patterns, direct comparisons between extreme situations should be avoided. Thus, a country is not necessarily compared directly with all the other countries, but only with those countries it has an affinity with. The pattern of affinity can change from basic heading to basic heading depending on the group of products being covered. Graduality provides a means of reconciling two contradictory requirements, namely, that the products countries price are both representative and comparable.

The number of products selected for a basic heading varied greatly: from 1 to over 100. The number selected depended on the type and the heterogeneity of the products covered by the basic heading, the homogeneity of the price ratios for the basic heading across countries as determined by the previous comparison, the availability of common representative products across countries and the importance of the basic heading as measured

by its share of overall expenditure. The availability of common representative products was itself dependent on the number of participating countries, the extent to which their markets and expenditure patterns were similar, and the type of specification used to define selected products.

Each product selected was defined by a product specification. This was to ensure that countries priced equivalent or comparable items, thereby avoiding the bias that can be introduced into the comparison by differences in quality. Ideally, all specifications would have been brand and model specific so that countries would have priced products of identical quality. In practice, this was not possible. *Generic specifications*, which describe the relevant characteristics of the product to be priced without mentioning a particular brand and model, had also to be employed. Invariably some variability in quality between the products priced by countries occurred. Neither CIS Statcommittee nor Goskomstat of Russia adjusted prices to compensate for differences in quality, but price data were edited. Countries were asked about apparent discrepancies and corrected price data were supplied in most cases. Mismatches in quality were dealt with either by re-matching the prices reported (an ex post refining of the specifications) or by discarding them.

- Specifications for consumer items generally named the brands and models to be priced. Much depended on the type of good or service being specified. For example, specifications for clothing, footwear, furniture and services were mostly generic. It also depended on the origins of the specification.

- Specifications for equipment goods were mainly by brand and model; they listed technical characteristics that related to performance, operation and quality. Even so, for a large number of items, there was an understanding among CIS countries and Mongolia as to which makes and models were to be priced.

- For construction in CIS and Mongolia comparison utilized another method of construction described in 2.4. Construction projects were defined by bills of quantities that specified in detail the material and factor inputs and also materials were defined. Given the complexity and country-specific nature of construction projects, the emphasis was on comparability and representativeness. Countries were required to price a number of standard, but fictitious, construction materials. After that construction projects were calculated. Countries were required to follow the pricing guidelines that had been drawn up to minimise the quality differences that can arise from too flexible interpretation.

- Specifications for government services defined a selection of occupations in collective government, in public health and in public education for which countries have to report the compensation of employees. The occupations selected were intended to be representative of education levels and occupational categories usually found in public administrations. The job descriptions were taken from 1988 versions of the ISCO.

From organizational point of view the item list for CIS and Mongolia comparison is divided into 14 surveys (9 – consumer goods (991-999), 1 – machinery and equipment (EQ), 3 – construction (C1-CM)). All questionnaires as well as for compensation and employees (1 survey) have been prepared with above-mentioned software. The questionnaires designed for collection of prices were sent to the countries by the e-mail; they included data on the item list. Special instruction on the work with software was prepared in order to facilitate the work with the questionnaires in Russian. For analysis of diagnostic tables special instruction on checking prices was also sent the countries in Russian.

The final product lists for the 2000 comparison covered around 1500 consumer goods and services, 46 occupations in government, education and health services, 310 types of equipment goods and 100 construction projects. (see Annex)

The number of consumer goods and services specified was particularly large. This was due to the number of countries covered (each of which had to be able to price at least one representative product per basic heading), the degree to which expenditure patterns and markets converged across countries and the preference for brand and model specifications. However, as already mentioned, countries were not required to price all products, but only a selection of them. Deciding on which products to price was an essential part of pre-survey work undertaken by countries prior to collecting prices.

Prices of consumer items were scheduled to be collected during 2000. The prices to be collected were purchasers' prices.

CIS countries and Mongolia provided CIS Statcommittee and Goskomstat of Russia with their price data by the 1<sup>st</sup> quarter of 2001 as scheduled.

Organisation of the price collections was the responsibility of the national statistical services. In CIS countries and Mongolia, data collection was financed by the countries themselves.

All participating countries utilised, wherever possible, price data collected for their consumer price indices. Even so, all of these countries found that special pricing was unavoidable. These countries provided CIS Statcommittee and Goskomstat of Russia with a national annual price for each item covered.

Because their free rent market is small and because there is no consistency between the rents paid by the majority of tenants and those recorded in the national accounts, CIS countries and Mongolia reported data on the number, size and facilities of their housing stock. This enabled Goskomstat of Russia to estimate the volume of housing services directly and derive "rents" indirectly by dividing the volume measures into the values of housing services.

Prices of capital goods were collected in 2000. Countries reported national annual prices. The prices reported were purchasers' prices.

- In CIS countries and Mongolia, responsibility for the collection of prices for capital goods rested with the national statistical services.

- The pricing of machinery and equipment was undertaken by the national statistical services themselves.

- The pricing of construction materials had to be done by the national statistical services. Priced materials from all the participating countries has been sent by Goskomstat of Russia to employed experts outside statistical service for checking and calculation construction projects. It made possible to price 100 construction projects. Participating countries marked as asterisk \* representative items and deleted projects which were not constructed at all.

Data were also required on government services, national expenditures, exchange rates and population totals.

- In the absence of market prices, input prices were collected for government services. Only compensation of employees was covered; prices were not collected for either intermediate consumption or capital consumption. Countries reported the average compensation paid in 2000 to those working in selected occupations in collective government, in public health and in public education. In addition to gross salary, compensation included employer's contributions to social security, pension and life insurance schemes. When such schemes were unfunded, employer's contributions were imputed in line with the national accounting practices followed by the country.

- Expenditure data were collected at the 1<sup>st</sup> half 2002 as firm estimates of GDP for 2000 became available. Countries were required to provide a breakdown of national

expenditure by basic heading for 2000. Most countries were able to do this. This breakdown was then applied to the latest estimates for GDP and the main expenditure categories available for 2000 at the time of calculation.

- Data on exchange rates and population were also required for the comparison. The exchange rates were the annual averages published by national Central banks for 2000.
- The 2000 population totals were those available to CIS Statcommittee and Goskomstat of Russia at the time of calculation.

After collection, the price data were edited at the level of the basic headings. This involved checking prices product by product across countries and it therefore required the prices of all countries to be reviewed simultaneously. Countries working with CIS Statcommittee and Goskomstat of Russia generally respected deadlines and Goskomstat of Russia was able to edit their price data survey by survey according to agreed schedule.

The object of the editing procedures employed by CIS Statcommittee and Goskomstat of Russia was to identify those countries whose average prices for a product generated price level measures that fell outside a specified range. The price level measure used to edit the data involved converting the average prices for a product into a common currency, averaging the converted prices across the countries pricing it and expressing the converted price of each country as a percentage of the overall average price. Percentages that fell outside a given range were investigated. The prices for a product were converted to a common currency with the PPPs that had been calculated for its basic heading using the unedited prices. The range was set using the coefficient of variation of the overall average price.

Having identified these countries, it was then necessary to establish whether or not their average prices for the product accurately reflected their price levels for this type of product. This was done by looking at the comparative price levels of the countries for other products in the same basic heading. If the comparative price levels for the product were different from the comparative price levels of the other products in the basic heading, it then had to be ascertained whether this was because the product was unrepresentative or whether it was due to some other reason such as a quality difference, a failure to convert the price to the specified unit or a misinterpretation of the product specification. It was also possible that the difference was not due to any of these reasons and that the product, though representative, had an average price that did not provide the same comparative price level as the other products in the basic heading; in such cases the prices were considered correct and retained.

All prices that Goskomstat of Russia considered to be suspect were sent back to the countries for verification. Usually countries either changed the price or suppressed it. Sometimes countries confirmed the price but indicated that the product should be considered as unrepresentative. Sometimes both price and representativeness was changed. Countries also supplied information that led to product specifications being further refined and prices rematched.

### ***5. Limitations of price and volume measure***

GDP and GDP per head are often used to rank countries by economic size and economic welfare. However, neither the indices of real final expenditure on GDP nor the indices of real final expenditure per head on GDP should be used to establish a strict ranking of countries. Instead they should be used to assign countries to groups. This is because they provide only an indication of the relative order of magnitude of economic activity or economic well-being in a country in relation to others in the comparison.

PPPs are statistical constructs rather than precise numbers. The error margins surrounding PPPs depend on the reliability of the expenditure weights and the price data as

well as to the extent to which the particular goods and services selected for pricing by participating countries truly represent the price levels in each country. As is the case with national accounts data generally, it is not possible to calculate precise error margins for PPPs and the real expenditure levels derived from them. Nonetheless, at the level of GDP, a broad and arbitrary rule of thumb is that differences in indices of real final expenditure and real final expenditure per head need to be at least five percentage points to be considered as statistically significant. At the level of the main aggregates, error margins are larger and differences in indices of real final expenditure and real final expenditure per head will also need to be larger to be statistically significant. Below the level of the main aggregates, error margins are compounded by differences in national classifications used by participating countries in their national accounts.

Comparative price levels at the level of GDP allow the general price levels of countries to be compared: a value over 100 indicates a higher general price level, a value under 100 indicate a lower general price level. Comparative price levels at the level of GDP also indicate the degree to which a country's exchange rate reflects its general price level vis-à-vis the general price level of the reference country: a value over 100 indicates that the exchange rate understates the general price level, a value under 100 indicates that the exchange rate overstates the general price level. This is not the same as saying a currency is undervalued or overvalued.

Although PPPs appear in international trade theory in the context of equilibrium exchange rates - that is the underlying rates of exchange to which actual exchange rates are assumed to converge in the long term - the PPPs discussed here are not relevant for this purpose as they do not refer solely to domestically-produced tradeable goods and services valued at export prices. They have been calculated specifically in order to enable international price and volume comparisons to be made for GDP and its components. As such, they refer to the entire range of *final* goods and services which make up GDP as a whole including many items which are not traded. Moreover, they are valued at *domestic* market prices and are calculated using expenditure weights that reflect *domestic* demand.

## **6. Users of PPPs**

The main users of PPPs are widely perceived to be the international organisations, such as Eurostat, the International Monetary Fund, the OECD, the United Nations and the World Bank, and this was undoubtedly so when PPPs first became available. Now, however, there is a growing demand for PPPs from a variety of national users. These include government agencies, universities, research institutes, public enterprises, private firms, banks, journalists and individuals.

International organisations, government agencies, universities and research institutes use PPPs as inputs into economic research and policy analysis requiring comparisons between countries. In such studies, PPPs are employed either as currency converters to generate volume measures with which to compare levels of economic performance, economic welfare, consumption, investment, economic growth, overall productivity and selected government expenditures or as price measures with which to compare price levels, price structures, price convergence and competitiveness. Journalists make similar uses for PPPs in their commentaries on economic and social policy.

Public enterprises and private firms employ PPPs as currency converters for the purposes of comparative analysis involving prices, sales, market shares and production costs. Banks tend to use PPPs to estimate equilibrium exchange rates, while individuals often use them in salary negotiations when moving from one country to another.

International organisations also use the real expenditures generated by PPPs for statistical purposes. The real expenditures are used to aggregate GDP and its component

expenditures across countries to provide totals for groups of countries, such as the European Union and the OECD. Country shares in these totals are used as weights when non-additive economic indicators, such as consumer price indices or growth rates, are combined to obtain averages for groups of countries.

PPPs are not used by international organisations for calculating member countries' contributions nor for assessing their eligibility for aid grants or access to loans on favourable terms. The exception is the European Commission. Some 25 per cent of its total budget is spent on the Structural Funds, the overall aim of which is to gradually reduce economic disparities between and within EU Member States. The allocation of the bulk of the funds is made on the basis of PPP-converted GDP per capita.

### **7. Presentation of Results**

All comparison results present the data in 8 tables. *Table 1* and *Table 3* present the data on which the other six tables are based.

- *Table 1* gives the final expenditure on GDP at national prices in national currency of the participating countries. It also gives their mid-year population and their annual average exchange rate vis-à-vis the Russian ruble.

- *Table 2* gives a structure of final expenditure on GDP at national prices in national currency of the participating countries.

- *Table 3* gives the PPPs national currencies per Russian ruble that have been calculated for the participating countries using the price and expenditure data collected during the 2000 round. The PPPs were obtained by the EKS method of calculation and aggregation. They are transitive. They provide real expenditures that are not additive and not subject to the Gerschenkron effect.

- The estimates of GDP and its component expenditures in *Table 1* are compiled according to the 1993 SNA for all countries.

- The final expenditures on the main aggregates in *Table 1* are consistent with those in each country's national accounts at the time of calculation. The final expenditures for analytical categories below the main aggregates were determined by the expenditure weights provided by countries for 2000. Nonetheless, there may be some differences between the expenditures in *Table 1* and those in a country's own series. Expenditures of NPISHs have been allocated to miscellaneous goods and services.

- The mid-year population totals are those reported by countries at the time of calculation. The exchange rates are annual averages published by national Central banks.

- *Table 4* gives the comparative price levels of final expenditure on GDP. They are ratios of the PPPs in *Table 3* to the exchange rates in *Table 1* expressed as indices with Russia= 100. They indicate for a given aggregate the number of units of the common currency needed to buy the same volume of the aggregate in each country. Comparative price levels that exceed 100 indicate that the level of prices in that country and for that analytical category is higher than the average price level for Russia.

- *Table 5* shows the final expenditure on GDP of *Table 1* converted to Russian rubles using the PPPs from *Table 3*. PPPs equalise the purchasing power of different currencies during the process of conversion and the converted expenditures are expressed (that is at the same price level). As such, they are *real* measures, equivalent to a time series of GDP for a single country at constant prices. Hence, they are called "real final expenditures". The real final expenditures in the table reflect only differences in the volumes of goods and services purchased in the countries. As the PPPs in *Table 3* were obtained using the EKS method of calculation and aggregation, the real expenditures in *Table 5* are not additive; nor are they subject to the Gerschenkron effect.

- *Table 6* gives the real final expenditure on GDP of *Table 5* expressed on a per capita basis using the mid-year population totals from *Table 1*. The real expenditures per head in this table are not additive; nor are they subject to the Gerschenkron effect.

- *Table 7* and *Table 8* present the real final expenditure on GDP from *Table 5* and the real final expenditure per head on GDP from *Table 6* as indices with CIS11 = 100.

Like the PPPs, all the price and volume indices shown in the tables can also be rebased on another country or country group, simply by dividing the series for the analytical category through by the figure shown for the country or country group selected as base. This is because the EKS method provides PPPs that are transitive.

Number of representative and priced items in participating countries

Annex

Code of survey	No. of selected representative items	ARM		AZB		BLR		GEO		KAZ		KGZ		MDA		RUS		TJK		TMN		UZB		MNG	
		No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *	No. of priced items	of which with *
1	440	335	305	244	227	249	233	300	281	352	237	251	244	302	236	391	377	223	195	175	129	229	147	229	153
2	216	162	134	133	129	151	141	163	150	161	135	131	129	161	148	171	152	136	132	110	105	137	101	153	77
3	245	156	140	125	122	134	129	151	131	157	146	98	97	139	113	224	212	98	93	78	72	124	92	115	88
4	189	148	121	112	110	103	99	129	113	139	118	69	67	141	107	172	154	91	83	89	89	95	58	95	64
5	233	165	155	99	92	114	97	137	116	126	82	65	63	148	88	203	193	94	83	89	47	96	56	131	108
6	150	126	109	120	115	119	113	122	110	125	118	99	99	121	94	139	138	103	96	103	103	118	90	98	87
7	201	123	123	107	107	65	62	109	106	92	81	57	57	100	100	147	144	64	64	31	31	99	98	75	66
8	71	53	51	49	48	34	31	48	40	53	49	34	32	49	47	55	54	30	29	22	12	30	26	47	30
9	40	14	12	19	15	22	10	32	24	23	11	14	12	18	18	39	39	13	13	16	13	8	7	10	7
c1	101	66	66	72	72	100	100	66	66	71	71	46	46	83	83	100	98	81	81	99	98	60	49	51	51
c2	101	66	66	72	72	100	100	66	66	71	71	46	46	83	83	100	98	81	81	99	98	60	49	51	51
c3	101	66	66	72	72	100	100	66	66	71	71	46	46	83	83	100	98	81	81	99	98	60	49	51	51
cm	100	57	57	57	57	62	45	46	46	44	43	16	16	72	72	91	78	38	38	99	23	42	22	16	16
eq	310	140	94	186	183	144	103	73	69	159	106	58	58	137	137	290	264	101	101	133	129	99	97	104	94
sal	46	41	41	40	40	40	40	32	32	40	40	34	33	40	40	46	46	43	43	46	46	40	40	42	42