

# Appendix 10C. Sources and methods for military expenditure data\*

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## I. Introduction

This appendix describes the sources and methods for the SIPRI military expenditure data provided in the tables in chapter 10 and appendix 10A, and on the SIPRI Internet site, URL <<http://projects.sipri.se/milex.html>>. For a more comprehensive overview of the conceptual problems and sources of uncertainty involved in all sets of military expenditure data, the reader is referred to other sources.<sup>1</sup> The data in this Yearbook are not easily linked with the SIPRI military expenditure series for earlier years. In particular, they cannot always be combined with the SIPRI series for the earlier years, 1950–87, since there has been a major revision in the data for many countries for the period beginning in 1988. Data are also continuously revised and updated, in particular for the most recent years, as data for budget allocations are replaced by data for actual expenditure. Changes in base years and method of currency conversion also hinder comparison between volumes of the SIPRI Yearbook. In the current Yearbook, the base year for the constant dollar series is 2000. Conversion to constant US dollars has been made by the use of market exchange rates (MERs) for all countries (for details, see section IV). Consistent data for the period since 1988 are available on request from SIPRI and on the SIPRI Internet site.

## II. Purpose of the data

The main purpose of the data on military expenditure is to provide an easily identifiable measure of the scale of resources absorbed by the military. Military expenditure is an input measure which is not directly related to the ‘output’ of military activities, such as military capability or military security.<sup>2</sup> Long-term trends in military expenditure and sudden changes in trend may be signs of a change in military output, but such interpretations should be made with caution.

Military expenditure data as measured in constant dollars (table 10A.3) are an indicator of the trend in the volume of resources used for military activities with the purpose of allowing comparisons over time for individual countries and comparisons between countries. The share of military expenditure in gross domestic product (GDP: see table 10A.4) is an indicator of the proportion of national resources used for military activities, and therefore of the economic burden imposed on the national economy.

<sup>1</sup> Such overviews include: Brzoska, M., ‘World military expenditures’, eds K. Hartley and T. Sandler, *Handbook of Defense Economics*, vol. 1 (Elsevier: Amsterdam, 1995); Herrera, R., *Statistics on Military Expenditure in Developing Countries: Concepts, Methodological Problems and Sources* (OECD Development Centre: Paris, 1994); and Ball, N., ‘Measuring third world security expenditure: a research note’, *World Development*, vol. 12, no. 2 (1984), pp. 157–64.

<sup>2</sup> For a discussion of this, see also section II of chapter 9 in this volume.

\* Table 10C was prepared by Natasza Nazet.

### III. Coverage of the data

The military expenditure tables in appendix 10A cover 158 countries, including most countries with a population exceeding 1 million. This volume of the Yearbook covers the 10-year period 1993–2002. Consistent SIPRI data are available from 1988 onwards for all countries.

Total military expenditure figures are calculated for three country groupings—by geographical region, membership in international organizations and income per capita. The coverage of these groupings is provided in the notes to table 10A.1.

#### Definition of military expenditure

The definition of military expenditure adopted by SIPRI, based on the NATO definition, is used as a guideline. Where possible, SIPRI military expenditure data include all current and capital expenditure on: (a) the armed forces, including peacekeeping forces; (b) defence ministries and other government agencies engaged in defence projects; (c) paramilitary forces, when judged to be trained and equipped for military operations; and (d) military space activities. Such expenditure should include: (a) military and civil personnel, including retirement pensions of military personnel and social services for personnel; (b) operations and maintenance; (c) procurement; (d) military research and development; and (e) military aid (in the military expenditure of the donor country). Civil defence and current expenditure for previous military activities, such as for veterans' benefits, demobilization, conversion and weapon destruction, are excluded.

In practice it is not possible to apply this definition for all countries, since this would require much more detailed information than is available about what is included in military budgets and off-budget military expenditure items. In many cases SIPRI is confined to using the national data provided, regardless of definition. Priority is then given to the choice of a uniform time-series for each country to achieve consistency over time, rather than to adjusting the figures for single years according to a common definition. In cases where it is impossible to use the same source and definition for all years, the percentage change between years in the deviant source is applied to the existing series in order to make the trend as correct as possible. Such figures are shown in square brackets. In the light of these difficulties, military expenditure data are not suitable for close comparison between individual countries and are more appropriately used for comparisons over time.

### IV. Methods

#### Estimation

SIPRI data reflect the official data reported by governments. As a general rule, SIPRI assumes national data to be accurate until there is evidence to the contrary. Estimates are made primarily either when the coverage of official data does not correspond to the SIPRI definition or when there is no consistent time-series available. In the first case, estimates are made on the basis of an analysis of official government budget and expenditure accounts. The most comprehensive estimates of this type, those for China

and Russia, have been presented in detail in previous Yearbooks.<sup>3</sup> In the second case, differing time-series are linked together. In order not to introduce assumptions into the military expenditure statistics, estimates are always based on empirical evidence and never on assumptions or extrapolations. Thus, no estimates are made for countries which do not release any official data, and these countries are shown without figures. SIPRI estimates are presented in square brackets in the tables (these are most often used when two different series are linked together). Round brackets are used when data are uncertain for other reasons, such as the reliability of the source or the economic context.

Data for the most recent years include two types of estimate which apply to all countries. First, figures for the most recent year(s) are for adopted budget, budget estimates or revised estimates, and are thus more often than not revised in subsequent years. Second, the deflator used for the last year in the series is an estimate based on part of a year or as provided by the International Monetary Fund (IMF). Unless exceptional uncertainty is involved in these estimates, they are not bracketed.

The world total and the totals for regions, organizations and income groups in table 10A.1 are estimates because data are not always available for all countries in all years. These estimates are most often made on the assumption that the rate of change in an individual country for which data are missing is the same as the average in the region to which it belongs. When no estimate can be made, countries are excluded from the totals.

### Calculations

The SIPRI military expenditure figures are presented on a calendar-year basis, with a few exceptions. The exceptions are Canada, the UK and the USA, for which NATO statistics report data on a fiscal-year basis. Calendar-year data are calculated on the assumption of an even rate of expenditure throughout the fiscal year. The ratio of military expenditure to GDP is calculated in domestic currency at current prices and for calendar years.

The original data are provided in local currency at current prices (in table 10A.2). In order to enable comparisons between countries and over time, these are converted to US dollars at constant prices (table 10A.3). *The deflator* used for conversion from current to constant prices is the consumer price index (CPI) of the country concerned. This choice of deflator is connected to the purpose of the SIPRI data—they should be an indicator of resource use on an opportunity cost basis.<sup>4</sup>

Beginning in the current volume of the SIPRI Yearbook, *conversion to constant dollars* is done for all countries using the average MER. In previous Yearbooks, data for countries in transition and for North Korea were converted by use of the purchasing power parity (PPP) conversion rate.<sup>5</sup> The reason for abandoning the PPP

<sup>3</sup> Wang, S., 'The military expenditure of China, 1989–98', *SIPRI Yearbook 1999: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1999), pp. 334–49; and Cooper, J., 'The military expenditure of the USSR and the Russian Federation, 1987–97', *SIPRI Yearbook 1998: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1998), pp. 243–59.

<sup>4</sup> A military-specific deflator would be the more appropriate choice if the objective were to measure purchasing power in terms of the amount of military personnel, goods and services that could be bought from the monetary allocations for military purposes.

<sup>5</sup> The PPP dollar rate of a country's currency is defined as the number of units of the country's currency required to buy the same amount of goods and services in the domestic market as \$1 would buy

conversion method is to achieve methodological consistency and simplicity. Since the PPP rate is superior to the MER for international comparison of the consumption of resources in these countries, and even more so for developing countries, the ideal approach would be to use PPP rates for all countries.<sup>6</sup> This is, however, not possible since currently available PPP data are still not sufficiently reliable for all countries in the SIPRI database. Furthermore, PPP data for non-Organisation for Economic Co-operation and Development (OECD) countries are not regularly updated, which means that comparable PPP rates are not available for recent years. Therefore, for the sake of consistency and simplicity, SIPRI has adopted the practice of using MERs for all countries for the conversion to dollars in its military expenditure database, until more reliable and updated PPP data become available.<sup>7</sup>

The change from PPPs to MERs for countries in transition in this edition of the Yearbook results in a significant downward shift in the level of military expenditure for these countries. For Russia the difference between the PPP and the MER for the base year 2000 is almost 300 per cent. Thus, Russian military expenditure for 2002 in constant (2000) dollars is \$11.4 billion when converted by the use of MERs, but \$55.4 billion when using the PPP rate for conversion.

The choice of base year for the constant dollar series also has a significant impact on cross-country comparisons of expenditure data because different national currencies move against the dollar in different ways. In this edition of the Yearbook, the base year has been shifted to 2000—from 1998 in previous Yearbooks. This also has an impact on the regional shares in total world military expenditure. The most extreme example is East Asia, because of the implications for these countries of the financial crisis in 1997–98. Thus, while the share of East Asia in world military expenditure in 2002 is 13.5 per cent when expressed at constant 1998 prices and exchange rates (as in the *SIPRI Yearbook 2002*), it is 15.6 per cent with 2000 as the base year. For the USA the same percentages are 41.9 and 42.8 per cent, respectively.

## V. Limitations of data

Data on military expenditure are associated with a number of limitations. They are of three main types: reliability, validity and comparability.

The main problems of reliability are due to the limited and varying definitions of expenditure. The coverage of official data on defence expenditure varies significantly between countries and over time for the same country. In many countries, the official data cover only part of actual military expenditure. Important items can be hidden under non-military budget headings or can even be financed entirely outside the government budget. A multitude of such off-budget mechanisms are employed in practice.<sup>8</sup> Furthermore, in some countries actual expenditure may be very different

in the United States. *World Bank Indicators 2000* (International Bank for Reconstruction and Development/World Bank: Washington, DC, Mar. 2000), p. 283.

<sup>6</sup> The issues involved in the conversion of local currency figures to dollar figures are described in the appendix on sources and methods in *SIPRI Yearbook 1999* (note 3), appendix 7C, pp. 327–33. The appendix also presents a table showing the impact of using PPP rates rather than market exchange rates.

<sup>7</sup> A benchmark survey of price levels used for producing PPP rates is planned for 2003. The hope is that this survey will produce more reliable PPP rates.

<sup>8</sup> For an overview of such mechanisms see Hendrickson, D. and Ball, N., *Off-Budget Military Expenditure and Revenue: Issues and Policy Perspectives for Donors*, CSDG Occasional Papers no. 1 (King's College, London, Conflict, Security and Development Group (CSDG): London, Jan. 2002).

from budgeted expenditure—it is most often higher, but in some cases it may be significantly lower. These factors limit the utility of military expenditure data.

A second reason for their limited utility is the very nature of expenditure data. The fact that they are merely input measures gives them limited utility as an indicator of military strength or capability. In reality, the composition of military expenditure has a major impact on the military capability it provides, as does the technological level of military equipment, the state of maintenance and repair, and so on. The most appropriate use of military expenditure data, even when reliably measured and reported, is therefore as an indicator of the economic resources consumed for military purposes.

For the purpose of international comparison, a third complicating factor is the method used for conversion into a common currency, usually the US dollar. As illustrated above, the choice of conversion factor makes a great difference in cross-country comparisons of military expenditure. In the most extreme cases, the choice of a PPP conversion factor instead of the market exchange rate can result in a ten-fold increase in the dollar value of a country's military expenditure.<sup>9</sup> This is a general problem in international comparisons of economic data which is not specific to military expenditure. Still, it does represent a major limitation, which should be borne in mind when using military expenditure data converted by different types of conversion rate.

## VI. Sources

The sources for military expenditure data are, in order of priority: (a) primary sources, that is, official data provided by national governments, either in their official publications or in response to questionnaires; (b) secondary sources which quote primary data; and (c) other secondary sources.

The first category consists of national budget documents, defence white papers and public finance statistics as well as responses to a SIPRI questionnaire which is sent out annually to ministries of finance and of defence, central banks and national statistical offices of the countries in the SIPRI database. It also includes government responses to questionnaires about military expenditure sent out by the United Nations and the Organization for Security and Co-operation in Europe (OSCE).

The second category includes international statistics, such as those of the North Atlantic Treaty Organization (NATO) and the IMF. Data for NATO countries are taken from NATO defence expenditure statistics published in a number of NATO sources. Data for many developing countries are taken from the IMF's *Government Finance Statistics Yearbook*, which provides a defence line for most of its member countries. This category also includes publications of other organizations which provide proper references to the primary sources used. The three main sources in this category are the *Europa Yearbook* (Europa Publications Ltd, London), the *Country Reports* of the Economist Intelligence Unit (London), and the *Country Reports* by IMF staff.

The third category of sources consists of specialist journals and newspapers.

The main sources for economic data are the publications of the IMF: *International Financial Statistics*, *World Economic Outlook* and *Staff Country Reports*. The source

<sup>9</sup> See the table for comparisons between PPP-converted and MER-converted military expenditure data in *SIPRI Yearbook 1999* (note 3), appendix 7C.

for most PPP rates is *World Development Indicators* (International Bank for Reconstruction and Development).

## VII. Reporting of military expenditure data to SIPRI and the UN

Each year SIPRI sends out a questionnaire to most countries of the world—except for the very small countries which are assumed not to have any sizeable armed forces—asking them to provide official data on their military expenditure for the preceding five years. The request is sent to their embassies in Stockholm or another nearby embassy as well as to relevant ministries, central banks and national statistical offices. The SIPRI questionnaire is much less detailed than the UN reporting instrument.<sup>10</sup> SIPRI disaggregates military expenditure into six categories: (a) military and civilian personnel, including retirement pensions and military personnel and social services for personnel; (b) operations and maintenance; (c) procurement; (d) military construction; (e) military research and development; and (f) paramilitary forces, when judged to be trained and equipped for military operations. Table 10C shows the rates of response to requests by SIPRI and the UN for military expenditure data for 2002.

Despite the increases in the rates of response to both SIPRI and the UN, the rate of response was still low in 2002. SIPRI received 59 replies (column 3)—approximately 37 per cent of the 158 countries covered in the SIPRI database; the UN received 67 replies (column 5)—approximately 35 per cent of all 189 member states. A total of 79 countries (column 6) provided data in 2002. This was an increase compared to the reporting in 2001, when a total of 73 countries reported.<sup>11</sup> The number of responses to the UN increased from 55 in 2001 to 67 in 2002 while the number of responses to SIPRI increased from 48 to 59.

Only three countries in *Africa*—Mauritius, the Seychelles and South Africa—replied to SIPRI's questionnaire. The UN received five replies, from Mauritius, Senegal, the Seychelles, Sierra Leone and Zimbabwe. Because of the low level of information available for Africa, SIPRI has conducted a study to assess the availability of military expenditure data in the African region.<sup>12</sup>

Latin America is a region with little transparency in military expenditure. A reporting lag of two years or more for the majority of countries makes accurate estimates of military expenditure difficult. Of the 11 *South American* countries from which SIPRI has requested information, only Brazil, Chile and Colombia responded in 2002, as has been the case during previous recent years, while Argentina has never replied to SIPRI's questionnaire. From *Central America*, SIPRI received replies only from Guatemala and Trinidad and Tobago in 2002. The UN received returns from the Dominican Republic, El Salvador, Guatemala, Honduras and Mexico in Central America and from Argentina, Brazil, Chile, Ecuador and Peru in South America.

One of the five states of *Central Asia* replied to SIPRI—Kazakhstan—and two to the UN—Kazakhstan and Uzbekistan.

The countries in *East Asia* which replied to SIPRI were Cambodia, Japan, the Philippines and Taiwan. The countries reporting to the UN were Japan, Malaysia,

<sup>10</sup> On the UN system of voluntary reporting, see Loose-Weintraub, E., 'Official data on military expenditure', *SIPRI Yearbook 2002: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2002), appendix 6D, p. 303.

<sup>11</sup> Loose-Weintraub (note 10), p. 305, table 6D.

<sup>12</sup> Omitoogun, W., *Military Expenditure of African States: A Survey*, SIPRI Research Report no. 17 (Oxford University Press: Oxford, forthcoming, 2003).

**Table 10C.** SIPRI and UN requests for military expenditure data, 2002Figures are numbers of countries.<sup>a</sup>

Regions	SIPRI coverage 1	SIPRI request 2 <sup>b</sup>	SIPRI replies 3 <sup>c</sup>	UN coverage 4	UN replies 5 <sup>d</sup>	Total replies 6 <sup>e</sup>
Africa	50	50	3	51	5	6
America, North	2	2	2	2	2	2
America, Central	8	8	2	13	5	6
America, South	11	11	3	12	5	6
Asia, Central	5	5	1	5	2	2
Asia, East	16	16	4	16	5	7
Asia, South	6	6	3	8	1	4
Oceania	4	4	2	6	2	2
Europe, West	20	20	17	21	18	18
Europe, Central/East <sup>f</sup>	15	15	15	15	14	15
Europe, CIS	7	7	4	7	4	6
Middle East	14	13	3	15	2	3
Small states <sup>g</sup>	–	5	0	20	2	2
<b>Total</b>	<b>158</b>	<b>162</b>	<b>59</b>	<b>191</b>	<b>67</b>	<b>79</b>

<sup>a</sup> The number of replies actually received by SIPRI is higher than the number of countries because more than one reply was received from some countries.

<sup>b</sup> The number of countries to which requests were sent out is higher than the SIPRI coverage as the military expenditure database covers more states than the SIPRI Yearbook tables.

<sup>c</sup> Albania, Armenia, Australia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Cambodia, Canada, Chile, Colombia, Croatia, Czech Rep., Denmark, Estonia, Finland, France, Georgia, Germany, Guatemala, Hungary, India, Ireland, Italy, Japan, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (Former Yugoslav Rep. of, FYROM), Malta, Mauritius, Moldova, New Zealand, Netherlands, Norway, Pakistan, Philippines, Poland, Portugal, Romania, Seychelles, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Trinidad and Tobago, Turkey, UK, USA, Yugoslavia (Serbia and Montenegro).

<sup>d</sup> Albania, Argentina, Australia, Austria, Barbados, Belgium, Brazil, Bulgaria, Canada, Chile, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Georgia, Germany, Guatemala, Honduras, Hungary, Ireland, Italy, Japan, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (Former Yugoslav Rep. of, FYROM), Malaysia, Malta, Mauritius, Mexico, Moldova, Mongolia, Nepal, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Romania, Russia, San Marino, Senegal, Seychelles, Sierra Leone, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Thailand, Ukraine, UK, USA, Uzbekistan, Yugoslavia (Serbia and Montenegro), Zimbabwe. In addition, nil reports were submitted by the Cook Islands, Costa Rica, Fiji, Iceland, Liechtenstein, Monaco, Nauru, Palau, Panama, Qatar, Saint Lucia, Samoa.

<sup>e</sup> Totals may be smaller than the sums of columns 3 and 5 because the same country may appear in two columns.

<sup>f</sup> Excludes the Commonwealth of Independent States (CIS) member states.

<sup>g</sup> At least 20 UN member states are too small to have a defence force but are included here for the sake of completeness.

*Sources:* SIPRI questionnaires; and United Nations, Report of the Secretary-General on objective information on military matters, including transparency on military expenditure, UN documents A/57/263, 26 July 2002, A/57/263Add., 27 Sep. 2002, and A/57/263Add2, 19 Nov. 2002.

Mongolia, the Philippines and Thailand. The largest country in the region, China, did not reply to SIPRI or to the UN.

In *South Asia* India, Pakistan and Sri Lanka reported back to SIPRI and only Nepal to the UN. In *Oceania* two countries—Australia and New Zealand—responded to the SIPRI request in 2002.

Most, although not all, governments in Europe provide aggregate data on their military expenditure. In *Western Europe* 17 of the 20 countries covered by SIPRI responded to the questionnaire; 18 countries of the 21 UN members responded to the UN reporting system. For *Central and Eastern Europe* all 15 countries reported to SIPRI. Of the members of the Commonwealth of Independent States (CIS) in Europe, Armenia, Belarus, Georgia and Moldova reported to SIPRI—Armenia reporting for the first time. The largest country, Russia, did not reply to SIPRI but did report to the UN.

For the *Middle East*, the response rate is still low: three countries—Jordan, Lebanon and Turkey—replied to SIPRI, and only two—Jordan and Lebanon—reported to the UN.



