Appendix 8C. 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 8 and appendices 8A and 8B, and on the SIPRI website, URL <http://www.sipri.org/contents/milap/>. 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.[1] The data in this edition of the Yearbook should not be linked with the SIPRI military expenditure series in earlier editions because data are continuously revised and updated. This is true in particular for the most recent years as data for budget allocations are replaced by data for actual expenditure. In some cases entire series are revised as new and better data become available. Consistent series dating back to 1988 are available on the SIPRI website and on request from SIPRI. These series cannot always be combined with the SIPRI series for the earlier years, 1950–87, since SIPRI conducted a major review of the data for many countries for the period beginning in 1988. Changes in base years and method of currency conversion also hinder comparison between editions of the SIPRI Yearbook. In this edition, the base year for the constant dollar series (table 8A.3) is 2005. Conversion to constant US dollars has been made using market exchange rates (MERs) for all countries (see section IV).

II. The 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.[2] Long-term trends in military expenditure and sudden changes in trend may be signs of a change in military output, but such an interpretation should be made with caution.

Military expenditure data as measured in constant dollars (table 8A.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. Military expenditure as a share of gross domestic product (GDP) (table 8A.4) is an indicator of the proportion of a country's resources used for military activities, and therefore of the economic burden imposed on the national economy.

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[1] Such overviews include Brzoska, M., 'World military expenditures', eds K. Hartley and T. Sandler, *Handbook of Defense Economics*, vol. 1 (Elsevier: Amsterdam, 1995); Ball, N., 'Measuring third world security expenditure: a research note', *World Development*, vol. 12, no. 2 (1984), pp. 157–64; and Omitoogun, W., *Military Expenditure Data in Africa: A Survey of Cameroon, Ethiopia, Ghana, Kenya, Nigeria and Uganda*, SIPRI Research Report no. 17 (Oxford University Press: Oxford, 2003).

[2] See Hagelin, B. and Sköns, E., 'The military sector in a changing context', *SIPRI Yearbook 2003: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2003), pp. 282–300.

III. The coverage of the data

The military expenditure tables in appendix 8A cover 167 countries. This edition of the Yearbook covers the 10-year period 1997–2006.

Total military expenditure figures are calculated for three country groupings—by geographical region, by membership of international organizations and by income per capita. The coverage of each of these groupings is provided in the notes to table 8A.1.

The definition of military expenditure

The definition of military expenditure adopted by SIPRI 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 past military activities, such as for veterans' benefits, demobilization, conversion and weapon destruction, are excluded.

In practice it is not possible to apply this definition to all countries, since this would require more detailed information than is available about what is included in military budgets and about off-budget military expenditure items. In many cases SIPRI has to use 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 individual 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 tables. In the light of these difficulties, military expenditure data are not suitable for accurate comparison between 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 predominantly made 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 editions of the Yearbook.[3] In the second case, differing time series are linked together. In order not to

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[3] 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,

introduce assumptions or extrapolations into the military expenditure statistics, estimates are always based on empirical evidence. Thus, no estimates are made for countries that do not release any official data, and no figures are displayed for these countries. SIPRI estimates are presented in square brackets in the tables—this most often occurs 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 or years are for adopted budget, budget estimates or revised estimates, the majority of which are revised in subsequent years. Second, in table 8A.3, the deflator used for the final 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, these estimates are not bracketed.

The totals for the world, regions, organizations and income groups in table 8A.1 are estimates because data are not 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 one exception. For the USA, SIPRI follows the reporting format of the source—a financial-year basis. In order to calculate calendar-year data for the USA, data for the final financial year would have to be collected from sources not comparable to the North Atlantic Treaty Organization (NATO) statistics used for earlier years. Calendar-year data for other countries are calculated on the assumption of an even rate of expenditure throughout the financial year.

The original data are provided in local currency at current prices (table 8A.2). In order to enable comparisons between countries and over time, these are converted to US dollars at constant prices (table 8A.3). The *deflator* used for conversion from current to constant prices is the consumer price index of the country concerned. This choice of deflator is connected to the purpose of the SIPRI data—it should be an indicator of resource use on an opportunity-cost basis.[4] In order to better facilitate comparison to other current economic measures, often expressed in current dollar terms, the right-most column in tables 8A.1 and 8A.3 also provides military expenditure for 2006 in current US dollars.

Conversion to dollars is done for all countries using the annual average MER. If purchasing power parity (PPP) conversion rate were used instead of MERs, there would be a significant increase in the reported level of military spending in many countries.[5] For example, Russian military expenditure converted using PPP rates

1998), pp. 243–59; and 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.

[4] A military-specific deflator would be a 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 for the monetary allocations for military purposes.

[5] The PPP dollar rate of a country's currency is defined as 'the number of units of a country's currency required to buy the same amount of goods and services in the domestic market as a U.S. dollar would buy in the United States'. World Bank, *World Development Indicators 2003* (World Bank:

($82.8 million in 2006) is 2.4 times higher than in MER dollars ($34.7 million in 2006). In the most extreme cases, conversion using PPPs instead of the MER can result in a tenfold increase in the dollar value of a country's military expenditure.[6]

The PPP rate is in many ways a more appropriate conversion factor than the MER for international comparison of national economic data, especially for countries in transition and developing countries. Considering opportunity cost, the ideal approach would be to use PPP rates for all countries. However, this is not possible since currently available PPP data are not sufficiently reliable for all countries in the SIPRI database. Therefore, for the sake of consistency and simplicity, MERs will be used for all countries until more reliable, regularly updated PPP data become available.[7]

The choice of base year—the year in whose prices the data are expressed—also has a significant impact on cross-country comparisons of expenditure data because different national currencies vary against the dollar in different ways. Beginning in this edition of the SIPRI Yearbook, the base year has been changed to 2005, having previously been 2003. The most salient effect of this change is the decrease in the USA's share of 2005 total world military expenditure from 48 per cent using 2003 as the base year to 46 per cent when expressed in 2005 prices and exchange rates. The change of base year and the decline in the value of the US dollar in relation to other currencies over recent years also have an impact on the regional shares of total world military expenditure. For Europe, the region where currencies gained most against the dollar, the shift in base year from 2003 to 2005 has resulted in an increase of approximately 2.1 percentage points in the region's share of world military spending.

Each country's ratio of military expenditure to GDP (table 8A.4) is calculated in domestic currency at current prices and for calendar years.

V. The limitations of the data

A number of limitations are associated with the data on military expenditure. 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 military expenditure varies significantly between countries and over time for the same country. In many countries the official data cover only a part of total military expenditure. Important items can be hidden under non-military budget headings or can even be financed entirely outside the government budget. Many such off-budget mechanisms are employed in practice.[8]

Washington, DC, 2003), p. 285. On the problems of international comparison of military expenditure and currency conversion see Ward, M., 'International comparisons of military expenditures: issues and challenges of using purchasing power parities', *SIPRI Yearbook 2006: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2006), pp. 369–86. For a methodological description of the problems see 'Sources and methods for military expenditure data', *SIPRI Yearbook 1999* (note 3), pp. 327–33.

[6] Table 8.2 in chapter 8 shows the impact of using PPP rates rather than MERs on the level of military expenditure in dollar terms for the 15 countries with the highest military expenditure in 2006.

[7] The World Bank started a new round of benchmark surveys of price levels used for producing PPP rates in 2003. The ambition is that this will produce more reliable PPP rates.

[8] For an overview of such mechanisms see Hendrickson, D. and Ball, N., 'Off-budget military expenditure and revenue: issues and policy perspectives for donors', Conflict, Security and Development Group (CSDG) Occasional Papers no. 1, CSDG, King's College London, Jan. 2002, URL <http://www.dfid.gov.uk/pubs/files/offbudget-military-exp.pdf>.

Furthermore, in some countries actual expenditure may be different from budgeted expenditure—it is most often higher, but in some cases it may be significantly lower.

The expenditure data's validity is limited by its very nature: the fact that the data are only an input measure limits their utility as an indicator of military strength or capability. While military expenditure does have an impact on military capability, so do many other factors such as 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.

The comparability of the data is complicated by 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. This is a general problem in international comparisons of economic data, which is not specific to military expenditure. Nonetheless, it does represent a major limitation, and it 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 the finance and defence ministries, central banks, and national statistical offices of the countries in the SIPRI database (see appendix 8D). It also includes government responses to questionnaires about military expenditure sent out by the United Nations and, if made available by the countries themselves, the Organization for Security and Co-operation in Europe.

The second category includes international statistics, such as those of NATO and the IMF. Data for the 16 pre-1999 NATO member states have traditionally been taken from NATO military expenditure statistics published in a number of NATO sources. The introduction of a new definition in 2005 by NATO has made it necessary to rely on other sources for some NATO countries for the most recent years. Data for many developing countries are taken from the IMF's *Government Finance Statistics Yearbook*, which provides a defence heading for most IMF member countries, and from Country Reports by IMF staff. This category also includes publications of other organizations that provide proper references to the primary sources used, such as the Country Reports of the Economist Intelligence Unit.

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 Country Reports by IMF staff. The source for PPP rates is the World Bank's *World Development Report 2006*.