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REDUCTION OF MILITARY BUDGETS

Construction of military price indexes and purchasing-power parities for comparison of military expenditures

Report of the Secretary-General

1. The General Assembly, in its resolution 37/95 B of 13 December 1982, requested the Secretary-General, with the assistance of a group of qualified experts and with the voluntary co-operation of States, to undertake the task of constructing price indices and purchasing-power parities for military expenditures of participating States. The Assembly further requested the Secretary-General to submit progress reports to it at its thirty-eighth and thirty-ninth sessions and a final report at its fortieth session.
2. The Group of Experts on the Reduction of Military Budgets, appointed by the Secretary-General pursuant to that resolution, submitted progress reports on its work during 1983 and 1984 (A/38/354 and Corr.1 and A/39/399).
3. By a letter dated 14 June 1985, the Chairman of the Group of Experts submitted the final report, which is annexed to the present document.

* A/40/150.

ANNEX

Construction of military price indexes and purchasing-power
parities for comparison of military expenditures

(Prepared by the Group of Experts on the Reduction of Military Budgets)

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FOREWORD BY THE SECRETARY-GENERAL

The General Assembly, in its resolution 37/95 B of 13 December 1982, requested the Secretary-General, with the assistance of a group of qualified experts and with the voluntary co-operation of States, to undertake the task of constructing price indices and purchasing-power parities for military expenditures of participating States and to submit progress reports to the Assembly at its thirty-eighth and thirty-ninth sessions and a final report at its fortieth session.

Pursuant to that resolution, the members of the Group of Experts on the Reduction of Military Budgets were appointed after consultation with Member States and the Secretary-General submitted progress reports on the work of the Group to the Assembly at its thirty-eighth and thirty-ninth sessions in 1983 and 1984, respectively (see A/38/354 and Corr.1 and A/39/399).

The Group of Experts have constructed the price indices and purchasing-power parities of the States which had accepted to participate in the exercise and have thus carried out the mandate set forth in General Assembly resolution 37/95 B.

The Secretary-General wishes to thank the members of the Group of Experts for their unanimous report, which he hereby submits to the General Assembly for its consideration. It should be noted that the observations and recommendations contained in the report are those of the members of the Group of Experts. In this connection, the Secretary-General would like to point out that, in this complex field relating to disarmament, he is not in a position to pass judgement on all aspects of the work accomplished by the experts.

LETTER OF TRANSMITTAL

14 June 1985

Sir,

I have the honour to submit herewith the report of the Group of Experts on the Reduction of Military Budgets, which was appointed by you in pursuance of paragraph 5 of General Assembly resolution 37/95 B of 13 December 1982.

The members of the Group of Experts appointed in accordance with that resolution were the following:

Col. Vito Caporaso
Chief of the Logistics-Administrative Office of the Army Staff
Ministry of Defence
Administration Command Corps-Army Staff
Rome, Italy

Mr. Hans Christian Cars
Deputy Director
Ministry of Defence
Planning and Budget Secretariat
Stockholm, Sweden

Mr. Jose A. Encinas del Pando
Professor (on research leave)
University of Lima
Lima, Peru

Mr. Daniel Gallik
Senior Economist
United States Arms Control and Disarmament Agency
Washington, D.C., United States of America

Mr. Stefan O. Mateescu
Senior Economist
Central Statistical Office
Bucharest, Romania

Col. Victor O. Odeka
Commandant
Nigerian Army School of Finance and Administration
Lagos, Nigeria

His Excellency
Javier Pérez de Cuéllar
Secretary-General of the United Nations
New York

/...

Mr. Benjamin Parwoto
(AVM Indonesian Air Force)
Commanding General Materiel Command (Komatau)
Lanuma Hussein Sastranegara
Bandung, Indonesia

The report was prepared between February 1983 and June 1985. During that period, the Group held six sessions at United Nations Headquarters in New York: from 7 to 11 March and 8 to 19 August 1983; 6 to 17 February and 9 to 20 July 1984; and 19 February to 9 March and 10 to 14 June 1985.

At the first and second sessions of the Group in 1983, the expert appointed to serve from Romania was Mr. Stefan O. Mateescu who was replaced on 6 June 1984 by Col. Arcadie Sasu. On 21 May 1985, Col. Sasu was replaced by Col. Gheorghe Lepadat. Also, Col. Vito Caporaso of Italy who attended two sessions in 1983 and one session in 1984 was replaced by Col. Gaetano Battaglia, who attended the two sessions of 1985.

The Group was assisted in its work by Professor Jacques Fontanel of the University of Grenoble, France, who served as consultant. Mr. Fehmi Alem of the Department for Disarmament Affairs served as Secretary of the Group. Valuable assistance was also received from Professor Alan Heston formerly of the United Nations Statistical Office, presently Professor of Economics at the University of Pennsylvania.

Pursuant to General Assembly resolution 37/95 B, I have submitted to you two progress reports, one in 1983 and one in 1984. In my capacity as Chairman of the Group of Experts, I have been requested to transmit to you this final report which has been unanimously adopted by the Group.

Accept, Sir, the assurances of my highest consideration.

(Signed) Hans Christian CARS
Chairman of the Group of
Experts on the Reduction of
Military Budgets

CHAPTER I

INTRODUCTION

A. Historical background

1. The United Nations has long been concerned with the question of the reduction of military budgets, both as an approach to disarmament and as a step leading to the allocation of greater resources for the purposes of economic and social development, in particular for the benefit of the developing countries. The specific item of reduction of military budgets was first included in the agenda of the General Assembly at its twenty-eighth session in 1973, on the basis of the initiative of the Union of Soviet Socialist Republics, which led to the adoption of General Assembly resolution 3093 A (XXVIII) on 7 December 1973. That resolution called for a 10 per cent reduction of the military budgets of the five permanent members of the Security Council and the allocation of part of the funds thus saved to provide development assistance.

2. In response to the above-mentioned proposal, some Member States pointed to the difficulties involved in comparing and verifying national military budgets in the form in which they are customarily published. Subsequently, another resolution adopted at the initiative of Mexico, General Assembly resolution 3093 B (XXVIII), requested the Secretary-General to prepare, with the assistance of a group of qualified experts, a report on this question, which was also to cover other States with a major economic and military potential. The report submitted in 1974 by the Group of Experts, 1/ transmitted to the General Assembly at its twenty-ninth session by the Secretary-General, noted the complex nature of the problem, particularly with respect to an acceptable definition of the scope and content of military budgets, the reduction of military expenditures as a disarmament measure, as well as the problem of verification. A report of the Secretary-General (A/10165 and Add.1 and 2) was submitted in 1975, in implementation of General Assembly resolution 3254 (XXIX) of 9 December 1974, giving views and suggestions of States on the report submitted earlier in 1974.

3. A second Group of Experts appointed by the Secretary-General provided in its report, 2/ submitted to the General Assembly at its thirty-first session in 1976, the major components of a system of military expenditure concepts, definitions and measurement procedures. It also proposed a reporting matrix to be part of an instrument for an international standardized reporting system and recommended the implementation of such a system for military expenditures on that basis. Finally, the Group suggested that the reporting system be operationalized, tested and refined.

4. The report of the Secretary-General on the reduction of military budgets (A/32/194 and Add.1) submitted to the General Assembly at its thirty-second session in 1977 by another Group of Experts considered the future development of the reporting instrument and examined the practical problems involved in completing the proposed matrix. It was felt that operational testing and refining of the instrument would be preferably carried out by a small number of countries, although participation would be open to all States. The sample should reflect different

military budgeting and accounting systems and emphasis was placed on the co-operation of States with large military expenditures. Concerning the testing and refinement of the instrument through the completion of the matrix by a number of States, the Group recommended that this task should be entrusted to an ad hoc panel of experienced practitioners in the field of military budgeting under the aegis of the United Nations. The reactions of States concerning the proposed test of the instrument for the reporting of military expenditures were contained in a report of the Secretary-General on the reduction of military budgets (A/S-10/6 and Corr.1 and Add.1), submitted to the General Assembly at its tenth special session in 1978. At that session, the Assembly reaffirmed the need to continue consideration of concrete steps to facilitate the reduction of military budgets.

5. Accordingly, the Ad Hoc Panel on Military Budgeting, appointed by the Secretary-General pursuant to General Assembly resolution 33/67 of 14 December 1978, completed in 1980 the practical testing of the reporting instrument which consisted of a proposed reporting matrix and instructions. As a result of this testing, in which 14 Member States actively participated on a voluntary basis, the Ad Hoc Panel concluded in its 1980 report (A/35/479, annex) 3/ that the practical test of the instrument had been completed and that, under the circumstances prevailing at the time, no further testing was necessary. This, however, did not exclude further refinement of the instrument in the light of future experience gained in the course of its implementation and through a broader participation of Member States.

6. On this basis, the Ad Hoc Panel recommended the early implementation of the revised reporting instrument in a general and regular system to be used by all States for their reporting of their military expenditures. This might entail comments by States leading to further refinement of the reporting instrument, and the Panel expressed the view that it would be valuable if those comments came from a wider range of countries. It also recommended steps to promote increasing participation of Member States and to provide information about the recommended reporting instrument.

7. The Panel also recommended that a further study should be undertaken of the problems of comparing military expenditures among different States and in different years, as well as the problem of verification that would arise in connection with agreements on the reduction of military expenditures.

8. It may be noted that, parallel to the efforts of the series of the above-mentioned and subsequent expert groups in this field, another activity began at this time within the framework of the Disarmament Commission with a view to considering somewhat different aspects of the reduction of military expenditures. At its thirty-fourth session, the General Assembly concluded that a new impetus should be given to endeavours to achieve agreements to freeze, reduce or otherwise restrain, in a balanced manner, military expenditures, including adequate measures of verification satisfactory to all Parties concerned. Consequently, since 1980, the Assembly has requested the Disarmament Commission to attempt to identify and work out the principles which should govern the further action of States in the field of freezing and reducing military expenditures, keeping in mind the possibility of embodying such principles into a suitable document at an appropriate stage.

9. At its thirty-fifth session, the General Assembly, in its resolution 35/142 B of 12 December 1980, took note of the report of the Secretary-General prepared by the Ad Hoc Panel on Military Budgeting (A/35/479, annex) 3/ and decided to adopt the system for standardized reporting of military expenditures as tested and recommended by the Panel. Subsequently, the Secretary-General, in annual reports (A/35/479, A/36/353 and Corr.2 and Add.1 and 2, A/37/418 and Corr.1 and Add.1, A/38/434, A/39/521 and Add.1 and 2 and A/40/313 and Add.1), published information communicated to him by Member States on their military expenditures in standardized form using the reporting instrument.

10. In the same resolution, the General Assembly also requested the Secretary-General, with the assistance of an ad hoc group of qualified experts, (a) to refine further the reporting instrument; and (b) to examine and suggest solutions to the question of comparing military expenditures among different States and between different years, as well as to the problems of verification that would arise in connection with agreements on the reduction of military expenditures.

11. The Group of Experts on the Reduction of Military Budgets appointed by the Secretary-General completed its report (A/S-12/7, annex) 4/ in 1982, in which it, inter alia, concluded that the political and technical aspects of international and intertemporal comparisons of military expenditures are closely and continuously interrelated and that the political aspects may even be the fundamental ones. The Parties must show the political will to arrive at agreed solutions and to provide the data and other assistance needed for comparison and verification purposes.

12. It also concluded that, as in the case of other disarmament agreements, a verification system will be necessary to provide assurances that all Parties were in compliance with the agreement, with due consideration to the nature of agreements on reduction of military expenditures. The Group was of the view that negotiations on the reduction of military expenditures should proceed on the basis that their results would not diminish any State's security; that agreement reached could be at the global, regional or sub-regional level, among nuclear-weapon States, other militarily significant States or among other States whether or not they are members of military alliances.

13. The Group concluded that a reliable system for reporting military expenditures such as the present standard reporting instrument and the successful demonstration of the feasibility of constructing military price indexes and purchasing-power parities (PPPs) for different States would facilitate future negotiations on the reduction of military expenditures. At the same time, these measures would facilitate various proposals to the effect that a share of the savings resulting from disarmament measures should be devoted to economic and social development, particularly for the benefit of the developing countries.

14. The Group therefore recommended that the reporting instrument, with slight modifications, should continue to be used by an ever-increasing number of States from different geographic regions and with different budgeting and accounting systems and that the Secretary-General, with the assistance of a group of qualified experts and with the voluntary co-operation of States, should undertake the task of constructing price indexes and PPPs for the military expenditures of participating States.

B. Mandate of the present Group of Experts

15. At its thirty-seventh session, the General Assembly, in its resolution 37/95 B of 13 December 1982, took note with appreciation of the report of the preceding Group of Experts (A/S-12/7, annex) 4/ and, inter alia, requested the Secretary-General, with the assistance of another group of qualified experts and with the voluntary co-operation of States, to undertake the task of constructing price indexes and purchasing-power parities for the military expenditures of participating States. As also recommended by the preceding Group of Experts, this task should encompass a study of the problem as a whole, which would include the following:

- (a) To assess the feasibility of such an exercise;
- (b) To design the project and methodology to be employed;
- (c) To determine the types of data required, such as product descriptions, prices and statistical weights;
- (d) To construct military price indexes and purchasing-power parities.

C. Nature, scope and purpose of the exercise

16. According to the Group's interpretation of its mandate, the exercise which it has been requested to carry out is of a primarily technical-statistical nature. It involves the collection from participating countries of a relatively large number of carefully selected data on military products and prices together with detailed information on the countries' military expenditures. This need for a certain amount of statistical data is clearly implied by the very nature of the exercise itself and the task that has been assigned to the Group.

17. The methods for the construction of price indexes are generally well known and widely applied. Some countries already construct their own military price indexes on a regular basis. A special facet of this part of the present exercise, however, is the attempt which is made to construct military price indexes, in a simplified manner, while applying the same method and very similar sets of data for all countries. Results obtained and experiences gained from such a procedure might be of special interest, as practical methods of intertemporal comparison would presumably be required in the context of international negotiations on lasting agreements to reduce military expenditures.

18. The purchasing-power-parity (PPP) concept, however, is generally much less known. Practical experience in the construction and implementation of PPPs is of recent date and still relatively meagre. As exchange rates for various reasons prove to be rather poor instruments for international economic comparisons, there has for some time been a growing interest in finding instruments that are better suited for such comparisons. Thus, international bodies, such as the United Nations International Comparison Project, the Economic Commission for Latin America and the Caribbean (ECLAC), the Organisation for Economic Co-operation and

Development (OECD), the Council of Mutual Economic Assistance (CMEA), and the European Economic Community (EEC), have devoted special efforts to the construction of PPPs for the purpose of comparing large economic aggregates, such as gross domestic product, government expenditure, private consumption, among their respective member countries. Methods applied by and experiences gained in some of these projects have naturally been of great interest and value to the Group's own exercise.

19. Although there are precedents in the civilian field with regard to the construction of PPPs, the present exercise represents the first attempt to construct such parities for military expenditures. Furthermore, one is likely to find great differences between the civilian and military sectors, especially with regard to the availability of data. In that sense, this exercise may be regarded as a pioneering project.

20. In spite of these differences and in spite of the fact that this exercise concentrates only on one type of expenditure, its scope and nature is all the same very similar to those of the above-mentioned projects. In this context it might be worth noting that tasks of this kind are usually assigned to a permanent staff devoting itself entirely to the project in question in close and continuous co-operation with participating countries over the course of several years. In view of its mandate, the Group of Experts has had to carry out its exercise under quite different conditions.

21. The purpose of the Group's exercise is, however, not primarily to provide a set of fully concrete military price indexes and PPPs for immediate use in comparing the military expenditures of the countries participating in this particular exercise. The purpose is rather to assess the feasibility of constructing such instruments of comparison in order to throw light on the question of whether military price indexes and PPPs might be successfully constructed in the context of future negotiations with a view to facilitating agreements among the parties. That is to say, the experience of this exercise should help to judge if such an undertaking would prove feasible under favourable circumstances, even though the indexes and parities resulting from this particular exercise might need further refinement.

D. Participating States

22. In General Assembly resolution 37/95 B, the Secretary-General was requested to ascertain the willingness of States to participate in the exercise and to enlist their voluntary co-operation. In response to the Secretary-General's note verbale to all Member States pursuant to this request, several countries expressed themselves positively about the proposed exercise and eight of these - Australia, Austria, Finland, Italy, Norway, Sweden, the United Kingdom of Great Britain and Northern Ireland and the United States of America decided to take an active part in it.

23. The Group wishes to express its gratitude and appreciation for the valuable contributions made by these States and their appointed contacts in providing the information requested by the Group for the carrying out of its task.

CHAPTER II

METHODOLOGICAL ISSUES

A. Introduction

24. Methodological issues related to the construction of military price indexes and PPPs have been extensively treated by an earlier Group of Experts which submitted its report in 1982 (A/S-12/7, annex) 4/. Therefore, this chapter will only briefly review the most important methodological issues involved in intertemporal and international comparisons. For further information on these issues, reference is made especially to chapter III of the above-mentioned report.

25. Intertemporal and international comparisons of military expenditures require the use of specific methods based on price indexes and PPPs of purchasing power of currencies, which have already been applied extensively to economic aggregates. A price index is an instrument for measuring price changes which makes it possible to express expenditures of successive time periods in terms of constant prices, namely, real expenditures. PPPs are instruments for comparing real expenditures among countries. They are a particular form of price index because they are calculated by comparing the prices of the same commodities in two or more countries at a particular point in time. Price indexes could be combined with PPPs to enable international comparisons at other points in time.

B. Construction of price indexes

26. Three main methods of calculating indexes are currently used: the Laspeyres index, which uses the quantities produced or consumed in the past as weighting factors, the Paasche index, which uses the quantities of the current or latest year and lastly, the Fisher index, which is defined as the geometric mean of the two preceding indexes. Assumptions which would be made concerning a technological evolution of selected products point at the use of a chain index whereby the prices of year one are compared with those of year zero according to the weights of year one and the prices of year two with those of year one according to the weights of year two. This method is, however, not essential for the calculation of price indexes concerning a very limited number of years, as is currently being done by this Group of Experts. The Group has therefore decided to use a simple Paasche index which seemed slightly preferable to the use of a Laspeyres formula.

27. The construction of a military price index is neither a priori more difficult nor are the results less reliable than is the case for civilian price indexes, except for special difficulties with regard to the availability and quality of information and some other particularities which are dealt with in section D below.

28. Thus, the choice of products whose prices and weights are used for the construction of a price index is often subjective, as the availability of prices and quantity data (or expenditures) have to be considered and not only the statistical representativeness. If representative items of expenditure are excluded from the price index, the real movement of prices would be different from that described by the price index.

29. There is no problem of comparison as long as the products retain their characteristics. Changes, however, are likely to appear when comparisons are made for long periods. As shown below, several methods may be used to take into account changes in the qualities of products from one period to another.

30. It is sometimes useful to calculate a fictitious base price, in other words, the price which the new product would have had if it had existed during the base period. To do this, a special characteristic of the product susceptible of explaining its price must be determined. This supposes a direct and proportional relationship between the price of a product and its main characteristics. However, such relationships are often not clearly established. Moreover, the quality of a product is judged differently by different users.

31. In the econometric method, regression techniques are used to establish a relationship between the price of a product and several of its main characteristics. In this manner, a fictitious price can be calculated. However, the regression coefficients are often difficult to interpret and the relationships are usually unstable over time.

32. The method of classes of equivalence is used when the characteristics of a product are not quantifiable. The products are classed in terms of special qualities. This method involves the use of a rather lengthy and detailed questionnaire. The analyst himself evaluates the differences in characteristics as a base for comparing the products. The better known the qualities of the products the less subjective is this method. Much use has been made of this method in this study.

33. The calculation of price indexes involves choices and hypotheses which are of more than just technical significance, as they could have an important impact on the assessment of a country's compliance with an agreement to reduce military expenditures.

34. The calculation of a price index makes it possible to assess the importance of real change in a country's expenditures and the results can also be used to calculate, by simplified methods, PPPs for the time periods not covered by specific international comparison studies.

C. Construction of purchasing-power parities

35. Exchange rates are generally used to compare major national aggregates. Unfortunately, such comparisons would often lead to serious errors which would create great problems in the context of international negotiations on a reduction of military expenditures. The reasons for this are the following. In the first place, exchange rates have only a limited bearing on the domestic sector, they are sometimes arbitrary and they are governed by economic policies that affect their reliability as indicators of the relative purchasing power of currencies in their respective domestic markets. Exchange rates may be set either administratively by Governments or by the action of currency markets. There are erratic variations in market exchange rates owing to capital movements, differential rates of inflation

and changes in the growth of the technological, productive and selling capacities of countries.

36. The nature of a PPP can be illustrated by the following example. If expenditures on doctors are \$10,000 per day for country A and 30,000 francs per day for country B, and the rate of exchange between the dollar and the franc is set at six francs to one dollar, then country B, according to this method of comparison, spends \$5,000 for this service, or half of what country A spends. If the aim is to measure the quantity of services the two countries procure for their respective expenditures (assuming that the doctors of both countries have the same productivity), the number of doctors of the two countries accounting for corresponding expenditures can be taken as conversion factors. If country A has 5,000 doctors and country B has 4,000 doctors, the PPP can be calculated as follows: $(10,000/5,000)/(30,000/4,000) = \text{\$US } 0.267$ dollar for 1 franc, which equals 3.75 francs for \$US 1.

37. If it is known that the average price of a sample of doctors is respectively \$15 and 45 francs per hour, and if these prices are used as a criterion for calculating the purchasing-power parity of doctors, the result is 3 francs for \$1. Thus, starting from each of our three hypotheses, we obtain three indexes for converting francs into dollars, which diverge by as much as 6 to 3. If, in comparing military expenditures, it is decided to set aside the rates of exchange, there remain the methods based on prices or quantities.

Calculations based on:

(a) Exchange rates	(b) Average prices derived from expenditures and quantities	(c) Sampled relative prices
6 francs per dollar	3.75 francs per dollar	3 francs per dollar

38. The purchasing-power parity method is designed so as to avoid the kind of errors which result from comparisons by means of exchange rates. It involves collecting information on prices and characteristics for a selected number of goods and services (items) as well as on quantities and/or expenditures. The selected items should be correctly defined, common to many countries, representative of the subcategories analysed and economically significant. States should therefore be asked to furnish the prices (or quantities) of similar goods and services.

39. The fundamental principle is to include the goods and services with the largest expenditure weights. They should, however, also be representative of their respective subcategory. In the case of a subcategory where price patterns are uniform among all countries, a single product can be selected. On the other hand,

if the relative prices of the products within a particular subcategory vary widely from country to country, a large sample of significant goods and services should be chosen. (This could be a critical problem with regard to military expenditures, owing to the relatively poor quality and availability of data.) It is usually impossible to make an inventory of identical goods and services in the countries under study. Some items of equipment may not exist in some countries or be present in very small numbers. One should therefore seek to choose products which are available in all countries and avoid comparing items which are of greatly differing importance in participating countries.

40. The selection of prices, is another difficult matter giving rise to several questions. For example, should gross or net salaries be selected? How are differences in social legislation to be taken into account? Should the sale price or the cost price of products be used? How can opportunity costs be taken into account when the price of an item is clearly subsidized or otherwise inappropriate?

41. When calculating purchasing-power parities, the following observations should be taken into account:

(a) The weights chosen should be characteristic of the economic structures of the countries;

(b) Transitivity should be established. In the case of three countries, this means that $P(A/B) = P(A/C)/P(B/C)$, where $P(A/B)$ represents the parity of country A relative to country B and where C represents a third country. This quality is often incompatible with the preceding condition;

(c) International price comparisons based on the weights of one country understate that country's expenditures in relation to those of other countries. There is a negative correlation between prices and quantities;

(d) Additivity makes it possible to determine the value of aggregates by simple addition of their component parts;

(e) The factor reversal test is used to verify that the product of the price and quantity indexes is equal to the ratio of values.

42. The quality of the comparisons depends on a proper correspondence in the list of goods and services for the countries studied as regards both the quality of the products selected and the weights used. Highly detailed studies should be made to demonstrate the similarity of the products and their comparability. A comparison between two members of a group of States is affected by the characteristics of the group. If emphasis is to be put on comparisons between two particular countries within a larger group of countries, use may be made of a method which has been advocated by Professor G. Hill ^{5/} who has proposed the following procedure for GDP (gross domestic product) comparisons:

(a) The United Nations Statistical Office would issue a list of products for which all countries are to furnish prices;

(b) A supplementary list could then be drawn up by, for example, the Statistical Office of the European Community or any other international body;

(c) The two sets of prices would be combined in a single table, and the "country-product-dummy" (CPD) method could be used to estimate the price missing in the table;

(d) The resulting PPPs then have the advantage of being the same for any pair of countries within a group, but regional specificities are also introduced. (The latter capability might be of particular interest for separate comparisons of countries with similar defence structures, such as the nuclear Powers.)

D. Problems specific to military expenditures

43. There are a number of problems which are particularly important with regard to the comparison of military expenditures, although they are not entirely unique. These problems include: (a) the secrecy surrounding military information; (b) the difficulty in determining prices; (c) the high degree of differentiation with regard to military equipment and construction; and (d) the lack of market prices.

(a) It is a well established fact that at present a substantial part of military information, especially with regard to weapons and weapon systems, is surrounded by secrecy in various degrees, depending on the country. Although it is possible to use various means of intelligence to estimate a country's physical forces in terms of numbers of ships or tanks, it is much more difficult to make financial estimates on the basis of such information. Often the cost of equipment is not made known, whether it is imported or manufactured domestically. On the one hand, Governments do not wish to indicate the cost of their purchases. Arms contracts are quite often linked to economic and/or political deals in which the real cost of arms is at times difficult or even impossible to establish by the participating Governments themselves. On the other hand, where domestically produced items are concerned, Governments and arms manufacturers generally do not wish to supply figures. Moreover, for the most sophisticated products such information is usually top secret and not at all available. This underlying difficulty is not unique for the military sector but it must be admitted that it is much more difficult to obtain basic information in this area than in other areas, although some countries are relatively open on weapons costs or prices;

(b) The actual prices of material are not always fully known. They depend, inter alia, on research and development which has taken place earlier, sometimes with both civilian and military objectives in mind. The fixed costs incurred during the first years are reduced in per unit terms by subsequent production in large quantities, but taking into account the instability of the market, it is difficult to know the number of equipment units over which the initial costs should be spread. Moreover, certain types of weaponry may be difficult to price separately as being parts of complex arms systems. In such cases, it may not be possible for countries to figure out the price of each product component, especially if a single firm has provided the entire system;

(c) Except for the most simple products (guns or hand-grenades, for instance), it is often difficult to compare a weapon produced in one country with a similar weapon produced in another country. The characteristics are different and the qualities of equipment vary with the defence arrangements, industrial infrastructure, innovative capacity and the technological level of the country concerned. Moreover, military equipment is sometimes developed in small series or belong to the class of unique goods, a veritable nightmare for statisticians. Finally, the incessant renewal of military goods and the continual changes in their quality, make the calculation of price indexes very complex;

(d) Prices of goods and services bought by the military sector are in many cases not subject to market price formation. This may be because they are either planned or subsidized by a central authority. These differences create particular problems when it comes to determining the prices which would be most suitable for international comparisons of military expenditures.

44. For a further discussion of the above-mentioned methodological issues, reference is made to the preceding report of 1982 of the Group of Experts (A/S-12/7, annex, paras. 60 to 124 and Working Paper III). 4/

CHAPTER III

COLLECTION AND TREATMENT OF DATA

A. Introduction

45. As mentioned earlier (see para. 22 above), the Secretary-General undertook, as a first step, to ascertain the willingness of States to participate in the exercise of the Group of Experts. The States which decided to do so were Australia, Austria, Finland, Italy, Norway, Sweden, the United Kingdom and the United States.

46. As a next step, with a view to facilitating the collection of information and the collaboration of participating States with the Group of Experts, all participants were asked by the Secretary-General, on behalf of the Group, to name a contact point for establishing direct and permanent relations between the Group and the respective States.

47. The Group communicated with the contacts by letter and questionnaire and, in addition, through meetings between contacts and the Group's Chairman and consultant. These meetings provided the opportunity to explain on the spot the main features of the exercise and to discuss the nature of the information the Group wished to obtain. This procedure considerably improved mutual understanding of the problems relating to the selection and furnishing of adequate information.

48. It was clear to the Group at the very outset of its exercise that the collection of statistical data from participating countries had to take place through an iterative process in close co-operation with the contacts. It was also seen by the Group when assessing its mandate that this collection of data must go well beyond the type of information that was already being submitted by several States within the framework of the United Nations reporting system, which applies to military expenditures only.

49. In this exercise, information was also needed on prices and characteristics of different military items (for example, goods and services bought by the military sector), in addition to such military expenditure data which already had or were being submitted to the United Nations by the participating countries on a regular basis or directly to the Group in the course of its exercise.

50. The selection and collection of this additional information had to proceed in stages, taking into account a number of difficulties with regard to the availability, interpretation and comparability of the data to be submitted by participating countries.

51. All through the exercise, the matrix of the United Nations reporting instrument served as an important basis for the Group's work on selecting and specifying its requests for data. In this matrix, military expenditures are disaggregated into operating costs, procurement and construction and research and development, and also into sub-subcategories such as purchased services and armoured vehicles, which allows for a rather detailed distribution of reporting countries' military expenditures among different cost categories. The Group endeavoured to obtain prices and product descriptions for a number of items within each of these sub-subcategories. The approach to obtain this objective could, however, for reasons described below not be the same for all the three major cost categories.

52. The Group decided that its requests for information should be limited to the fiscal years of participating countries most closely coinciding with the calendar years of 1980, 1981 and 1982, as such information might be available in 1983 when the Group started its work. It was considered important that the collection of information be undertaken in such a manner as to enable the Group to construct both price indexes and purchasing-power parities on the basis of data for the same types of items.

53. The Group also decided that the prices to be requested should be average prices for each of the three years mentioned above.

54. For the collection of information the Group constructed three questionnaires, one for each major cost category. The first of these was on operating costs.

B. Operating costs

1. Collection of data

55. As items within this cost category are fairly well known and rather similar in their nature among countries, the questionnaire on operating costs could contain precise requests for information on prices and quantities for several specified items within all sub-subcategories of the matrix, such as military personnel, civilian personnel and materials for current use.

56. For the personnel categories, two types of salary data were requested, one excluding and one including social security costs, such as health insurance, pension fees and other similar contributions that have to be made by the employer

for the benefit of the employees in addition to their salaries. In each category, a number of ranks and professions were selected as representative of the military and civilian personnel categories respectively. Contacts were also requested to give the number of man-years for each of these ranks and professions, as this information was needed for the purpose of finding appropriate sets of weights.

57. For items within the subcategory of operations and maintenance, no quantity data were asked for, as it was decided to weigh all such items equally within their respective sub-subcategory. Continuous efforts were, however, made to specify all items in such a way as to obtain price data that would be comparable among countries.

58. The structure of the questionnaire and all items included therein can be found in table 1. In response to its requests on operating costs, the Group received a great deal of relevant and comparable information from all participating countries. A few items turned out to cause problems of interpretation and were therefore later omitted from the list, but on the whole, the questionnaire proved to be suitable for its purpose.

59. The information concerning conscripts that was obtained initially, however, turned out to be less than sufficient when the Group was faced with the particular problems involved in comparing such different personnel categories as conscripted and enlisted privates. The following reasons may explain why this is both an important and difficult issue:

(a) Fundamentally different principles of compensation are applied in the two systems, causing wide disparities in rates of pay;

(b) The military roles and capability of conscripted and enlisted privates are not fully identical;

(c) Privates are by far the most numerous rank.

60. The Group began by considering two different approaches, both of which proved to have major shortcomings. In the first one, conscripted and enlisted privates were treated as separate items. This meant that their prices were not compared directly and countries with voluntary enlistment were considered to have purchased one type of goods with its own price level and countries with conscription, another type of goods with another price level. To the extent that conscripted and enlisted privates perform approximately similar functions with similar military capability, the disparity in their respective price levels seemed excessive and the approach would appear to lead to the overvaluing of the expenditures on enlisted privates. In the other approach, conscripted and enlisted privates were treated as the same item or product and their prices were compared directly. This implied that they had the same real worth and that their price ratio validly measured the relative real value of the expenditures on them. However, their prices would not be fully comparable and the assumption of equal worth would overstate the value of conscripts.

Table 1. The structure of the Group's questionnaire on operating costs

1.1 Personnel

1.1.1 Conscripts

Lieutenant

Sergeant

Private soldier until six months of service

Private soldier with one year of service or more

Volunteer

1.1.2 Other military personnel (two years of service in the respective rank)

Colonel

Major

Captain

Lieutenant

Staff sergeant

Sergeant

Corporal

Private

Private with eight years of service

Civilian personnel (two years of service in the respective profession)

Typist

Administrative civil servant with an academic degree

Car mechanic

Aircraft mechanic

Computer engineer with a basic academic degree

Warehouse worker

Kitchen worker

Medical doctor

Medical nurse

Scientist with a doctor's degree

1.2 Operations and maintenance

1.1.1 Materials for current use

Meals per day for one conscript (including all costs for the food itself its preparation)

Combat uniform for any army soldier (later replaced by a set of selected components)

Regular petrol/m³

Diesel fuel/m³

Aircraft fuel/m³

Light heating oil/m³

Full set of medical supplies for a mobile hospital having 75 beds

Average set of field rations to supply one soldier for a week

Table 1 (continued)

1.2.2 Maintenance and repairs

An hour's work in an army workshop for the repair of passenger cars
 Average costs per workshop hour of spare parts for the repair of passenger cars
 An hour's work in an air force workshop for the repair of supersonic aircraft
 Average costs per workshop hour of spare parts for the repair of supersonic aircraft
 Average yearly maintenance for a five-year old caserne for 250 soldiers
 Major repair (overhaul) of one diesel truck engine of about 150 hp
 Major repair (overhaul) of one fighter aircraft jet engine of about 26,000 lbs. thrust
 Major repair (overhaul) of one turbo-fan aircraft engine of about 1,600 lbs. thrust
 Major (overhaul) of one propeller aircraft engine of about 200 hp

1.2.3 Purchased services

Postage for a normal letter from one town to another within the country
 Local phone call
 Travel of one kilometre by railway in second class (average price)
 Travel of one kilometre by airplane in economy class (average price)
 Per diem for a captain including the cost for one night in an average hotel

1.2.4 Rent costs

Average rent for 100 m² in an administrative building in the capital

61. In assessing these alternative approaches, further consideration of both prices and quantities was undertaken. It was noted that the major reason was the difference in direct compensation to the personnel. Conscripts perform compulsory service and receive nominal or very low pay while the pay of voluntary enlistees must be high enough to compete with civilian employment and to attract a sufficient force.

62. Furthermore, it was also noted that part of the compensation of conscripts is in the form of subsistence in kind (meals, uniforms, housing) which appear in the "Operations and maintenance" category. For enlistees such expenditures are covered largely by their pay.

63. The Group then agreed that a third alternative possibility would be to adjust the price of conscripts upward by including the in-kind compensation of conscripts and shifting such expenditures from the "Operations and maintenance" to the "Personnel" category. However, the Group did not at first have available sufficient data to make such adjustments.

64. To avoid having to make a choice between two poor solutions, the Group decided to make another effort in order to collect some additional information on conscripts. This was done at a rather late stage by means of a supplementary questionnaire dealing with such matters as the number of conscript man-years and the total costs of conscripts with different lengths of service. This questionnaire is to be found in appendix I to the present report.

2. Treatment of data

65. For the purpose of constructing military price indexes, the Group decided to apply weights for military personnel according to the number of man-years in each rank, but equal weights to all other items within their respective sub-subcategory. The latter weights were based on the distribution of expenditures in 1982 as reported by the countries to the United Nations in the framework of its reporting system, or reported directly to the Group by means of the reporting instrument. Thus, the weights remained the same for the comparisons among all three years in question.

66. The Group also decided to use as much data as were made available by the contacts as long as they were regarded to be comparable over time. This means that the items used for the construction of price indexes may have differed slightly among the countries.

67. In the construction of purchasing-power parities, the Group used price data for a narrower set of items which were selected on the basis that the assumption could be made that each item was of the same kind and quality in all participating countries. This set of items is reproduced in appendix II, together with salaries and prices submitted by the contacts. In some cases, the figures have been adjusted for the purpose of ensuring a better comparability between the data from different countries.

68. In treating the submitted data and assessing their comparability, the Group proceeded on the basis of the following general rules and simplifying assumptions:

(a) Competence and training of all employed personnel within a particular rank or profession would be regarded as being equivalent in all participating countries;

(b) Salary data to be used for comparisons would be the variant that includes social security costs;

(c) Prices should include indirect taxes.

69. Concerning the comparison of conscripted privates with enlisted privates, the Group decided to adopt the following approach: conscripted privates were divided into two categories, one consisting of those who have served for a relatively long period and the other of newly enrolled conscripts. On this basis, the Group considered conscripts of the first category to be roughly comparable to enlisted privates as they could be expected to be able to fulfil the same types of combat functions as is required from enlisted privates.

70. Whether they could do this equally well may, of course, be a matter of discussion in which the following several aspects might be considered.

(a) Conscripts probably receive less training overall than enlisted privates, owing to a generally shorter length of service;

(b) Since, in the case of conscripts, a larger proportion of the total number of privates at any given time is less than fully trained, their military worth is less;

(c) The additional service time of enlistees beyond the training period may provide valuable military experience.

71. However, the following aspects might also be considered:

(a) By and large, conscripted and enlisted privates perform similar functions;

(b) Training time for each type is roughly similar, particularly when account is taken of reservist conscripts or conscripts in refresher training;

(c) The conscript system produces a relatively larger number of militarily trained personnel in the population as a whole than the enlisted system (per man-year of active duty). By providing more trained individuals and a larger trained reserve, greater overall military worth is created even if not in the form of standing forces;

(d) By conscripting from the general population, a greater commitment to national defence on the part of the entire population may be obtained.

72. A crucial question in this context is the number of months of training a conscript would need before he could be expected to have acquired about the same degree of military skills and capabilities as those of an average enlisted private. This is, no doubt, a highly difficult subject to different national experience. The present Group did not have the time to examine and analyse these differences, either between or within the two types of privates, in any depth. Such an examination would be desirable in the event of further refinement of military personnel PPPs in the future. The Group agreed, however, that conscripts with more than six months of training could be attributed a military value or capacity which would by and large be similar to the one of enlisted privates. It should be noted that this assessment relates to the group of conscripts with more than six months of service taken as a whole and not as much to those conscripts who have just completed their first six months of training. Conscripts with a training of less than six months were regarded by the Group as being generally incapable of carrying out wartime operations in combat functions. They were therefore treated as a separate item for which there was no corresponding item to be found in those participating countries having only enlisted privates.

73. On the basis of this general understanding among the experts about the military comparability of conscripted versus enlisted privates and of the many difficulties involved in such comparisons, the Group proceeded to calculate the

average yearly cost of conscripted privates with more and with less than six months of service, respectively. As conscripts are paid according to very different principles, both within and between countries, there was a need to standardize the calculations which was possible to do on the basis of the information which was received in response to the Group's supplementary questionnaire on conscription.

74. The costs thus calculated for the first category of conscripted privates were used for direct comparisons with the salaries and wages of enlisted privates and those of the second category for comparisons of conscripted privates with only little training among countries having conscription. Average yearly costs of conscripts as shown in appendix V and yearly salaries and wages for enlisted privates were entered together with all other relevant price data into the computation of the military purchasing-power parities, the results of which are presented in chapter IV.

C. Procurement and construction

1. Collection of data

75. The Group's questionnaire on procurement and construction reflected a different approach than the one on operating costs. This was due to the fact that items procured or constructed in different countries are likely to be much more heterogeneous than those that fall within the category of operating costs. This is probably even more so when only a limited period of time is taken into account, as in this exercise, inasmuch as several expensive types of equipment are procured by most countries only infrequently.

76. The Group, therefore, did not specify any particular items in its questionnaire for this cost category. The Group did, however, specify types of items within most of the sub-subcategories and request the contacts to find such items that might have been delivered in the 1980-1982 period and to submit prices and product descriptions for each of them.

77. Table 2 shows the types of items which the Group decided to work with, and table 3 gives two examples of the kind of data which was requested for separate items.

78. To this questionnaire, the Group attached a set of instructions or guidelines which should help the respondents to adopt a similar approach with regard to the determination of unit prices and other related matters. These instructions are reproduced in appendix III.

79. In response to this questionnaire, the Group received information on several items from all participants. The data that were submitted to the Group at some stage of its exercise are indicated in table 4 showing the number of items for which prices were reported. It should be noted that empty cells in this table does not necessarily indicate unwillingness to provide data, but may merely reflect the absence of the procurement of particular types of items in the prescribed time period.

Table 2. Main structure of the Group's questionnaire
on procurement and construction

2.1.1 Aircraft and engines

Transport aircraft
Fighter aircraft
Attack aircraft
Bomber aircraft
Bomber aircraft
Reconnaissance aircraft
Transport helicopters
Attack helicopters
Engines

2.1.1 Missiles, including conventional warheads

Strategic missiles
Surface to surface missiles
Air defence missiles
Air to air missiles
Air to surface missiles

2.1.3 Nuclear warheads and bombs

2.1.4 Ships and boats

Aircraft carriers
Major surface ships - cruisers
Major surface ships - light cruisers
Major surface ships - destroyers
Major surface ships - frigates
Major surface ships - corvettes
Light forces - fast attack craft
Light forces - patrol craft
Mine warfare forces
Submarines
Amphibious forces

2.1.5 Armoured vehicles

Main battle tanks
Light tanks and anti-tank vehicles
Fighting vehicles
Personnel carriers

2.1.6 Artillery

Anti-aircraft, self-propelled
Anti-aircraft, towed
Field artillery, self-propelled
Field artillery, towed
Mortars

Table 2 (continued)

- 2.1.7 Other ordnance and ground force weapons
 - Light man portable ground force weapons
 - Man portable anti-weapons
- 2.1.8 Ammunition
 - Small arms ammunition
 - Artillery ammunition
 - Land-mines
- 2.1.9 Electronics and communication
 - Radar systems, ground, vehicle-mounted and man portable
 - Radar systems, airborne and naval
 - Strategic defence
 - Radio systems, vehicle-mounted and man portable
 - Underwater detection systems
 - Electronic counter measures
- 2.1.10 Non-armoured vehicles
 - Jeep-type vehicles
 - Transport vehicles
- 2.2.1 Airbases, airfields
 - Landing runways
- 2.2.5 Personnel facilities
 - Barracks
- 2.2.6 Medical facilities
 - Hospitals
- 2.2.7 Training facilities
 - Firing ranges
- 2.2.8 Warehouses, depots, etc.
 - Warehouses
 - Maintenance and repair workshops

Table 3. Examples of requests for data on procurement and construction items

(a) Procurement

Country: _____

Sub-category: 2.1.2. Missiles, including conventional warheads

Type of item: 2.1.2.5. Air to surface missiles

Characteristics	Item No. 1	Item No. 2	Item No. 3	Item No. 4
Designation				
Number of warheads				
Type of warhead <u>1/</u>				
Range (km) on lowest elevation				
Weight (kg)				
Speed (km/h)				
Guidance				
Accuracy (m)				
Other important characteristics:				
Unit price of fiscal year nearest to 1980				
" 1981				
" 1982				

Our comments: 1/ Nuclear or conventional.

Your comments:

Table 3 (continued)

(b) Construction

Country: _____

Sub-subcategory: 2.2.5. Personnel facilities

Type of item: 2.2.5.1. Barracks

Characteristics	Item No. 1	Item No. 2	Item No. 3	Item No. 4
Designation <u>1/</u>				
Number of soldiers to be accomodated				
Floor space area (m ²)				
Other important characteristics:				

Unit price of fiscal
 year nearest to 1980 2/

" 1981

" 1982

Our comments: 1/ Troop accommodation, mess facility, officer's apartment or military shop.

2/ Price should not include equipment such as kitchen machinery, beds, etc.

Your comments:

Table 4. Survey of replies from participating States to the Group's questionnaire on procurement and construction

2.1 Procurement	Australia	Austria	Finland	Italy	Norway	Sweden	United Kingdom	United States
2.1.1.1. Transport aircraft				0		0	0	00
2.1.1.2. Fighter aircraft					0	0	0	0
2.1.1.3. Attack aircraft				00			0	0
2.1.1.4. Bomber aircraft							0	
2.1.1.5. Reconnaissance aircraft							0	
2.1.1.6. Transport helicopters				0000			00	0
2.1.1.7. Attack helicopters							0	0
2.1.1.8. Engines				00	0			00
2.1.2.1. Strategic missiles								
2.1.2.2. Surface to surface missiles				0	0			0
2.1.2.3. Air defence missiles								
2.1.2.4. Air to air missiles				0	0			0
2.1.2.5. Air to surface missiles					0		0	0
2.1.4.4. Destroyers							0	0
2.1.4.5. Frigates				0			0	0
2.1.4.6. Sea-bed operations vessel							0	
2.1.4.7. Fast attack craft				0	0	0		
2.1.4.8. Patrol craft							0	
2.1.4.9. Mine warfare forces						0	00	
2.1.4.10. Submarines				0		0	0	0

Table 4 (continued)

	Australia	Austria	Finland	Italy	Norway	Sweden	United Kingdom	United States
2.1.4.11. Amphibious forces								
2.1.5.1. Main battle tanks				0			0	
2.1.5.2. Light tanks and anti-tank vehicles		0						X
2.1.5.3. Fighting vehicles				0				
2.1.5.4. Personnel carriers		0			0			0
2.1.6.1. Anti-aircraft artillery								X
2.1.6.3. Field artillery, self-propelled		0		0				
2.1.6.4. Field artillery, towed				0				
2.1.6.5. Mortars							0	
2.1.7.1. Light man portable ground force weapons		000		0000		0	00	X
2.1.7.2. Man portable anti-weapons				0	0		0	0
2.1.8.1. Small arms ammunition	0000	0		0000	00			X
2.1.8.2. Artillery ammunition	0000	0		000	0		00	X
2.1.8.3. Land-mines				0000				
2.1.9* Airborne VHF (very high frequency) for ATC (air traffic control)							0	
2.1.9* Integrated communication system							0	

* These items were not assigned to any specific type.

Table 4 (continued)

	Australia	Austria	Finland	Italy	Norway	Sweden	United Kingdom	United States
2.1.9.1. Radar systems, ground, vehicle-mounted and man portable				0	0	0	0	X
2.1.9.2. Radar systems, air-borne and naval				0			0	X
2.1.9.3. Strategic defence				0				
2.1.9.4. Radio systems, vehicle-mounted and man portable		0		0000	0		0	X
2.1.9.5. Underwater detection systems				0				
2.1.9.6. Electronic counter measures				0000			0	
2.1.10.1. Jeep-type vehicles		0		0	0	0000	0	X
2.1.10.2. Transport vehicles		0		000			00 000 00	X
2.2. Construction								
2.2.1.1. Landing runways						0		0
2.2.5.1. Barracks	0000	000	00	00		0		0
2.2.6.1. Hospitals	0		0					0
2.2.7.1. Firing ranges	0000		0			00		
2.2.8.1. Warehouses	0000	00	0000	000		000		00
2.2.8.2. Maintenance and repair workshops	0000		0	0000		0		00

0 = price made available for at least one of the three years.

x = prices reported to be not available readily, but which could be provided with considerable effort at this time, or more easily at a later time when computerization of data for price indexes is completed.

80. A preliminary assessment of the first data received led to the conclusion that they were not only scarce, but also difficult in many cases to compare with one another. This was largely due to the fact that items for which prices were reported often constituted very different products even when they belonged to the same kind of subcategory.

81. The Group therefore endeavoured to collect more data from the contacts by means of sending them a compilation of hitherto submitted information asking them to find among their own country's military expenditure such items that would correspond closely with those already reported by one or more of the other contacts.

82. This approach led in turn to some improvement of the data and their comparability. However, it must be admitted that there is still a rather limited number of items for which data are available and a great deal of heterogeneity among them.

2. Treatment of data

83. The problems involved in the treatment and use of the data were perhaps less serious with regard to the construction of price indexes for procurement items of a recurring nature, as such items might be expected to remain relatively stable within a period of three years for which prices were requested by the Group. However, procurement of the same type of capital goods might not occur in three consecutive years.

84. Concerning the construction of PPPs, however, the Group avoided using prices for items which are clearly different with regard to their military utility. To do this, considerable effort was devoted to the analysis of reported items in order to assess which of them might be of sufficiently similar military value so that it would be appropriate to use their prices for the construction of PPPs.

85. The Group's assessment of reported data on procurement items was made even more difficult than for other items because of the generally high degree of secrecy surrounding all kinds of information on weapons and weapon systems. In addition to this basic difficulty in obtaining information on procurement items, some other examples of principal difficulties which arise in connection with comparisons of military weapons and other types of military equipment might also deserve some attention.

86. As already mentioned, the Group tried to give some guidelines to the contacts in order to harmonize their efforts to establish unit prices for complex items. The Group has, however, not had the time and necessary resources to examine the actual assumptions on which reported data have been based. If purchasing-power parities would be constructed in the context of negotiations on a reduction of military expenditures, parties would presumably have much better possibilities to devote more efforts to this and earlier mentioned problems than this Group has been able to do.

87. With all of the above-mentioned difficulties taken into account, the Group decided, however, upon a careful examination of available data on procurement items, to select a number of items which the Group found to be equal or at least reasonably similar with regard to their military value. Prices reported on these items have thus been used for the calculation of PPPs for the whole category of procurement expenditures. They were, however, not sufficient to permit the construction of PPPs for different subcategories of procurement. Items for which prices were used by the Group are presented in table 5.

88. The Group wishes to underline its view that this demonstration of a practical approach to the construction of PPPs for procurement deserves much greater interest than the actual results themselves, which undoubtedly would need much improvement and refinement for the reasons mentioned above.

89. Concerning the Group's assessment of reported data on construction items, the Group came to the conclusion that these data were so heterogeneous that they did not lend themselves to meaningful comparisons. This was largely due to insufficient specifications in the Group's questionnaire which led to highly diversified replies. A list of clearly specified construction items to be priced by the contacts would probably have yielded much better results.

90. The Group finds it unfortunate that it did not adopt such an approach while there was still time to do so. However, the Group notes that PPPs have been successfully constructed by other projects for expenditures on civilian construction and regards it to be a reasonable assumption that the characteristics of civilian and military construction are not much different. Thus, it should be possible to construct PPPs also for military construction, although, at this time, this Group has failed to do so.

Table 5. Procurement items comparable among countries

Procurements	Australia	Austria	Finland	Italy	Norway	Sweden	United Kingdom	United States
Fighter aircraft					F-16			F-16
Attack aircraft				Tornado			Tornado	
Aircraft engine					F-100-PW 200			F-100-PW 200
Air-to-air missile				AIM-9	AIM-9			AIM-9
Frigates*				Maestrale		Type-22	FRG-7	
Main battle tank*							Chal- lenger	M-1
Personnel carriers					M-113 A2			M-113 A2
Field artillery		M-109		M-109				
Rifle		MI 77				AK4	SLR	
Anti-tank weapon				MILAN			MILAN	
Small arms ammunitions (Cal:)	7.62	7.62		7.62	7.62			
Artillery ammunitions (Cal:)	105			105	105			
Jeep*				AR-76	Mercedes	TGB-11		

* Comparability of these items are based on additional data obtained from published reference books, such as Jane's All the World's ... series, (Jane's Publishing Company, London).

D. Research and development

1. Collection of data

91. Although there are some precedents with regard to the construction of civilian purchasing power parities for goods and services that are similar to those in the military categories of operating costs and procurement and construction, there are - to the Group's knowledge - no such precedents with regard to research and development. The Organisation for Economic Co-operation and Development (OECD), for instance, utilizes the PPPs for gross domestic products when it tries to compare expenditures on research and development. The United Nations International Comparison Project has, in its reports, not even addressed the problems of comparing research and development expenditures. Thus, when the Group started to prepare for international comparisons of military research and development, it was indeed on virgin land.

92. The first option that the Group considered was whether it could be possible to compare and evaluate outputs of research and development. The Group therefore discussed the possibility of requesting cost estimates for a number of well defined research and development projects. It came to the conclusion, however, that clear specifications of such projects would probably be very difficult to achieve. It was therefore considered that there would be a great risk that they might be misinterpreted by the contacts. The Group also noted that military research and development is often very specialized in view of which it seemed less appropriate to work on the basis of pricing a number of standard projects. The Group therefore decided to adopt another approach.

93. This approach pertained to the collection of data for a relevant sample of such items that constitute inputs into the process of military research and development. As those factors were not sufficiently known to the Group when it started to deal with these questions, it decided to construct a questionnaire for the purpose of collecting such information that would enable the Group to proceed to the selection of an appropriate sample of inputs at some later stage.

94. This first questionnaire, which is attached to the present report as appendix IV, merely requested information on certain kinds of distribution of the research and development expenditures of participating countries and some questions concerning the availability of price indexes for military and civilian research and development.

95. Concerning the latter questions, only the United States replied that it had a price index for military research and development, while the United Kingdom stated that it had one for civilian research and development. Both respondents explained in their replies the methods of constructing their indexes, which turned out to be based on input prices for three major expenditure categories, namely, personnel, equipment and other expenditures. The remaining countries replied that they had neither military nor civilian research and development price indexes.

2. Treatment of data

96. The distribution of military research and development expenditures among the military and civilian sectors is shown in table 6, while the distribution of such expenditures in the military sector among different cost categories is shown in table 7. Concerning the same distribution in the civilian sector, only the United States could give some information stating that 25 per cent of the expenditures in this sector were for personnel which was significantly less than in the military research and development sector.

97. Concerning the distribution of personnel expenditures among different categories of personnel, the two responding countries, Norway and Sweden, indicated a separate category for engineers while they placed researchers, scientists, support personnel and administrators in the same category.

98. A larger collection of data on a number of specifically selected research and development items would have been feasible if the Group had had more time to devote to this purpose. The Group did, however, use the information obtained from the contacts in response to this first questionnaire as a basis for selecting a number of items and groups of items within the operating cost category and for applying appropriate weights to all these items for the purpose of constructing - in a simplified manner - both price indexes and PPPs for military research and development.

Table 6. Distribution of military and civilian research and development expenditures

<u>Country</u>	<u>Research and development by the military sector</u>	<u>Research and development by the private civilian sector</u>
Austria	-	-
Finland	80	20
United Kingdom of Great Britain and Northern Ireland	32	68
Norway	55	45
Sweden	25	75
United States of America	24	76

Table 7. Distribution of military research and development expenditures by category

<u>Country</u>			
<u>Personnel</u>		<u>Equipment</u>	
Austria	NA	Austria	NA
Finland	60	Finland	17
United Kingdom	64	United Kingdom	7
Norway	51.3	Norway	32.8
Sweden	62	Sweden	8
United States	43	United States	10
<u>Current expenditures</u>		<u>Construction</u>	
Austria	NA	Austria	NA
Finland	20	Finland	3
United Kingdom	26	United Kingdom	3
Norway	11.4	Norway	4.5
Sweden	29.5	Sweden	0.5
United States	47	United States	0

CHAPTER IV

RESULTS, ANALYSIS AND POSSIBLE FURTHER IMPROVEMENTS

A. Introduction

99. An overall assessment of the data used for the construction of the military price indexes and PPPs shows that the information on goods and services within the category of operating costs has been more readily available and detailed than was the case for the other main cost categories. Concerning procurement and construction, participating States submitted information that proved to be uneven and in some cases not sufficient for the Group to construct its own military price indexes. In view of this, the Group decided to make use of substitute indexes from other sources such as OECD or to rely on special indexes which had been submitted directly by the contacts instead of or in addition to data on products and prices. This is also pointed out in table 8 where such figures are given in brackets. An example is given in appendix VI to show how the Group used submitted price data and expenditure weights for its calculation of price indexes for military expenditures on different levels of aggregation. In general, the Group hoped to use the same body of submitted price data for the purpose of constructing both price indexes and PPPs. In the case of PPPs, however, the additional requirement for international comparability of the items and the fact that ready-made national price indexes could be of no help meant that less of the available data was usable. A few supplementary comments on the data from each participating State may also help the reader better to understand and evaluate the results obtained.

100. Australia submitted data for more than one year only for personnel and a small number of procurement items. As salary data were substituted for missing operating cost data and operating costs represent a huge part of Australian total military expenditures, the reported high salary increases of about 20 and 10 per cent respectively for the two years of 1981 and 1982 have had an important impact on the military price index as constructed by the Group. This index is therefore likely to show a somewhat exaggerated rate of growth which could most probably have been adjusted, if the Group had received more detailed and accurate data in response to its repeated requests. Concerning the category of construction, the Group has substituted an index for residential construction in Australia as published by OECD.

101. Austria submitted detailed price information for all cost categories except for research and development as no expenditure data have been reported for this category. Concerning the category of construction, the Austrian contact submitted a specific price index which was used by the Group.

102. Finland submitted data as requested by the Group for items within the categories of operating costs and construction but reported that no data were available for procurement items. A specific price index for the whole category of procurement was, however, submitted and was used by the Group for its construction of the Finnish total military price index. The Finnish contact also submitted separate price indexes for more than 20 cost categories as used in the Finnish budgeting and accounting system to cover total military expenditures. In addition

Table 8. Military price indexes for major cost categories constructed by the Group a/

(Index 1980 = 100)

Countries	Operating costs		Procurement		Construction		Research and development		Total military expenditure	
	1981	1982	1981	1982	1981	1982	1982	1982	1981	1982
Australia	121.9*	132.4*	109.9	120.8	(112.4)	(125.1)	112.0*	123.6*	119.0	129.8
Austria	106.5	115.7	107.9	116.6	(109.0)	(117.9)	**	**	106.9	116.0
Finland	106.8	118.0	(108.4)	(116.3)	(110.2)	(117.7)	106.5	119.6	107.4	117.4
Italy	131.9	144.8	121.0	143.3	118.6	139.6	120.6	139.1	129.3	144.2
Norway	114.5	125.4	(111.2)	(122.3)	(109.3)	(117.2)	111.8	122.0	113.4	124.1
Sweden	109.4	118.0	112.5	123.5	105.7	111.2	110.4	117.4	110.2	119.1
United Kingdom	117.6	127.9	(109.5)	(118.0)	(112.9)	(112.9)	123.0	131.7	116.7	125.2
United States	110.5	117.4	112.7	131.6	107.7	106.9	109.8	113.8	110.9	120.5

* Based exclusively on submitted salary data.

** No such expenditures reported.

a/ Bracketed index numbers are not calculated by the Group, but are either suggested by the contact, in which case they are underlined, or collected as substitute indexes from civilian OECD statistics.

to these indexes, a set of expenditure weights was supplied enabling the Group to construct a total military price index on this basis as well. This index is shown in table 10.

103. Italy provided the information as requested for operating costs and, in addition to that, price data for more than 30 procurement and construction items. On this basis, the Group was able to construct price indexes both for all major cost categories and for total military expenditures.

104. Norway met the Group's requests with regard to operating costs. Concerning the category of procurement, Norway submitted price data for 10 items but also a specific price index for the whole of this category. As prices reported were the same for all three years for 8 of the 10 procurement items, the Group suspected that these items might be less representative and their prices therefore likely to underestimate the actual price increases regarding the procurement of military hardware. Thus, the Group chose to use the submitted specific procurement price index for its construction of the Norwegian total military price index. Concerning the category of construction, the Norwegian contact supplied a military construction price index which was also used by the Group. In addition to the data requested directly by the Group, the Norwegian contact submitted separate price indexes for 12 different cost categories together with a set of expenditure weights for 1982. On this basis, the Group constructed an alternative military price index which is shown in table 10.

105. Sweden provided the information on operating costs as requested by the Group and also price data for a relatively limited number of procurement and construction items. These data were used by the Group for its construction of procurement and construction price indexes, although it noted that the prices given for construction items were likely to underestimate the actual price increases in this sector. This was, however, regarded to create only a limited distortion, as this category was given a very small weight according to the distribution of Swedish military expenditures among different cost categories.

106. The United Kingdom submitted price data for all three years only for items within the category of operating costs. For the procurement and construction categories, the Group used substitute indexes, which were a producer price index for manufacturing industry and a cost of construction index for residential buildings respectively, both published by OECD.

107. The United States submitted requested operating cost data and in addition to that price data for more than 20 procurement and construction items. Reported prices of construction items seem to be very low for the year of 1982 but - as in the case of Sweden - if there is a distortion, it is likely to be quite small in view of the fact that expenditures on construction represent less than 5 per cent of the total military expenditures of the United States. The United States regularly prepares an extensive set of very detailed price indexes covering the military sector for use in its national income and product accounting. These indexes were not used in the present exercise.

Table 9. Military price indexes for subcategories of operating costs constructed by the Group

(Index 1980 = 100)

(a) Price indexes for personnel

Participating States	Conscripted personnel		Other military personnel		Civilian personnel		Total personnel	
	1981	1982	1981	1982	1981	1982	1981	1982
Australia	-	-	124.1	134.2	112.8	124.7	121.9	132.4
Austria	100	120.7	107.1	114.4	108.0	118.0	105.5	117.0
Finland	112.1	128.1	102.7	112.0	106.3	116.1	104.3	114.1
Italy	195.6	195.6	116.8	129.3	128.6	143.1	137.7	147.5
Norway	113.1	124.3	111.9	122.3	114.3	124.1	112.8	123.2
Sweden	105.4	110.9	106.3	112.5	106.7	113.6	106.3	112.5
United Kingdom	-	-	110.4	117.2	117.8	124.5	112.9	119.7
United States	-	-	108.4	119.2	109.8	115.9	108.8	118.1

(b) Price indexes for operations and maintenance

(Index 1980 = 100)

States	Materials for current use		Maintenance and Repairs		Purchased services		Rent costs		Total operations and maintenance	
	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982
Australia	-	-	-	-	-	-	-	-	121.91	132.38
Austria	105.0	107.3	115.9	125.0	108.1	112.9	107.5	117.4	108.5	113.3
Finland	111.4	125.6	107.8	118.4	110.5	123.3	100.0	160.0	109.4	122.0
Italy	121.8	145.8	119.7	137.1	118.7	139.7	114.7	133.3	119.9	139.2
Norway	118.0	126.3	118.2	129.5	118.3	142.1	111.5	123.8	117.9	129.7
Sweden	116.8	135.3	111.6	116.2	108.8	115.6	113.0	122.0	113.6	125.5
United Kingdom	120.2	136.6	133.6	145.9	117.7	124.9	-	-	122.8	137.0
United States	116.4	116.4	110.2	115.9	110.9	116.4	107.7	114.2	113.4	116.2

Table 10. Civilian and military price indexes

(Index 1980 = 100)

Participating States	Civilian price indexes				Military price indexes			
	GDP deflators		Consumer price indexes		As calculated by participating States ^{a/}		As calculated by the Group of Experts	
	1981	1982	1981	1982	1981	1982	1981	1982
Australia	110.3	122.5	109.7	121.9			119.0	129.8
Austria	106.3	113.3	106.8	112.6			106.9	116.0
Finland	111.7	121.7	112.0	122.5	111.2	120.7	107.4	117.4
Italy	118.3	138.9	119.5	139.2			129.3	144.2
Norway	114.0	125.2	113.6	126.5	112.1	124.4	113.4	124.1
Sweden	109.4	119.0	112.7	121.7			110.2	119.1
United Kingdom	111.6	119.6	111.9	121.5			116.7	126.2
United States	109.2	116.3	110.4	117.2	111.5	121.1	110.9	120.5

^{a/} or by the Group on the basis of specific sets of indexes and weights submitted by participating States.

B. Price indexes

108. The military price indexes which the Group has constructed on the basis of submitted information are shown in table 8 for major expenditure categories, and in table 9 for subcategories of operating costs. ^{6/} For the purpose of a comparative analysis, these results as obtained by the Group are compared in table 10 with other kinds of price indexes of participating countries such as:

(a) Gross domestic product (GDP) deflators;

(b) Consumer price indexes;

(c) Military price indexes as calculated either by participating countries themselves or by the Group on the basis of specific sets of indexes and weights submitted by the contacts, in addition to the price data which were requested for a number of specified items.

109. The Group believes that it would be relevant and useful to compare the Group's military price indexes presented in tables 8 and 10 with those either provided directly by the countries themselves or calculated by the Group on the basis of such indexes and weights which some countries use for their internal budgeting and accounting purposes regarding their military expenditures. It may be noted that some countries devote substantial time and efforts to construct their military or defence price indexes using a great deal of detailed information available in the countries. It should therefore not be expected that, under the present circumstances, the Group of Experts should be able to produce for such countries military price indexes which would be more accurate than those already in existence. However, a comparison with these indexes might cast light on the question regarding the reliability of the results achieved by this Group. Slight differences in the results might be explained, inter alia, by the fact that national definitions of military expenditures might differ from the one adopted by the United Nations and used by this Group. Two countries, Norway and the United States, have submitted special reports to the Group concerning their construction of national military price indexes and Finland also provided some information.

110. From Norway, the Group received a detailed description of a military price indexing system which had been developed in 1977 through joint efforts by the Ministry of Defence, the Ministry of Finance and the Central Bureau of Statistics in order to give the Norwegian political authorities the necessary background information for their budget decisions. As mentioned above, the Norwegian contact also supplied the Group with the statistical information (on an aggregate level) which the Norwegian authorities used for their construction of a military price index.

111. The United States submitted a large documentation concerning its system of military price indexing together with a great number of indexes on different levels of aggregation. It also supplied the actual index figures of 1980-1982 for total United States military expenditures, figures which are based on more than 4,000 detailed indexes for different types of military goods and services.

112. In Finland, there is no official military price index but the Ministry of Defence uses for its internal budgeting and accounting purposes a number of predominantly civilian price indexes. The Group has been able to construct a separate Finnish military price index using index figures and expenditure weights submitted by its Finnish contact.

113. Comparing the military price indexes of Norway, the United States and Finland, as described above, with the indexes constructed by the Group, it is interesting to note that there is a striking similarity between the results obtained in these two different ways for both Norway and the United States. Concerning the results for Finland, the main part of the difference might be explained by the use of different rates of salary and wage increases. The rates used by the Finnish Ministry of Defence for its own calculations are considerably higher than the rates reflected by the salary and wage data submitted to the Group by its Finnish contact for the three years of 1980 to 1982. If the same data had been used in both calculations, overall results would have come rather close to each other.

114. On this basis, the Group believes that it was able to achieve reliable results. It may also be worth noting that these results have been obtained by means of a simplified method, which has utilized a relatively limited amount of information. This matter is of special interest in the light of possible future negotiations on a reduction of military expenditures as a simple method and the use of easily verifiable data might greatly help to facilitate such negotiations.

115. The Group also believes that its military price indexes can be used to extrapolate military PPPs for the years of 1980 and 1981 on the basis of the parities which the Group has constructed for 1982. These parities and the method of extrapolation are presented in section C of this chapter.

116. The comparison between civilian and military price indexes shows that they, in many cases, are very different. It would therefore seem less satisfactory to rely on aggregate civilian price indexes such as the ones given in table 10 for the deflation of current military expenditures, in order to arrive at real expenditures for longer periods. The differences which appear in the table seem to provide a good case for the construction of special indexes for intertemporal comparisons of military expenditures. This would probably be even more important in the context of international negotiations on a reduction of military expenditures as negotiating Parties would supposedly be concerned with the concept of real military expenditures for which they would want to have accurate information. It may be noted that similarities between military and civilian prices and price movements are likely to be stronger in the market-type economies making up the present sample of participating countries than in other potential participants, such as centrally planned economies, where the homogenizing influence of market forces is less present.

C. Purchasing-power parities

117. The Group has constructed PPPs for participating States for their military expenditures on different levels of aggregation. The overall PPPs and those of the main cost categories are shown in table 11 (a) while the PPPs for subcategories within the category of operating costs are presented in table 11 (b). For subcategories within the other main cost categories, no PPPs were constructed by the Group.

118. Concerning table 11, the following observations might be made:

(a) The PPPs of the subcategories are very different for each of the participating States which should be an important aspect to consider, if negotiations would focus on only a part of the military expenditures or if special limitations would be negotiated for certain cost categories;

(b) The differences between the PPPs of each country indicate a distribution of cost advantages among participating States. For example, on the one hand, the United States seems to have a cost advantage with regard to procurement and construction in relation to all other participants, while those, on the other hand, seem to have an advantage over the United States regarding operating costs. This advantage is even slightly more pronounced for those States having conscripts. Although this tendency may not be very surprising the differences between the disaggregated PPPs may, however, be greater than one might have expected. A larger amount of comparable data on procurement and construction could presumably help to confirm or to improve the results obtained by the Group.

119. As mentioned earlier, the military price indexes can be used to extrapolate 1/ approximate military PPPs for the years of 1980 and 1981 on the basis of those arrived at for 1982. This is done by multiplying the PPP for each country with the price index of that country and by dividing it with the price index of the United States. These extrapolated PPPs for 1980 and 1981 are shown in table 12 together with the basic PPPs of 1982. For reasons of comparison, the table also shows the average exchange rates as published by the International Monetary Fund (IMF) and PPPs for gross domestic product (GDP) as calculated by OECD.

120. There is no simple pattern to be found in table 12 with regard to the differences between exchange rates and military PPPs among the countries in one particular year. The differences between the military PPPs and the PPPs for GDP are not comparable in absolute terms because the overall value of the currency of the United States is assumed to be 1.0 for each set of PPPs. It is, however, clear from table 12 that, while both the GDP and the military PPPs have remained rather stable over time, the exchange rates have changed considerably reflecting the rapid increase in the dollar rate which took place during these three years and also continued afterwards. The sometimes great differences between the exchange rates and the PPPs indicate the usefulness of the PPP method for comparing economic aggregates among countries.

Table 11. Military PPPs of 1982 as constructed by the Group

(a) PPPs for total expenditures and major categories

Participating States	Operating costs	Procurement and construction	Research and development	Total military expenditures
Australia	1.37	2.60	1.14	1.45
Austria	11.77	51.44	-	13.56
Finland	3.17	9.38 <u>a/</u>	4.91	4.00
Italy	567	2302	673	679
Norway	6.34	13.36	6.51	7.14
Sweden	6.24	11.63	5.37	7.10
United Kingdom	0.54	1.54	0.49	0.61
United States	1.05	0.89	1.05	1.00

(b) PPPs for subcategories of operating costs

Participating States	Military personnel	Civilian personnel	Operations and maintenance	Total operating costs
Australia	2.02	1.02	0.99	1.37
Austria	13.58	7.34	12.97	11.77
Finland	2.49	4.35	4.41	3.17
Italy	493	552	906	567
Norway	5.69	5.51	8.28	6.34
Sweden	6.74	5.81	5.81	6.24
United Kingdom	0.73	0.32	0.57	0.54
United States	1.03	1.15	1.01	1.05

a/ Based on data only for construction items.

Table 12. Exchange rates and various PPPs for participating States (1980-1982)

(National currency units per dollar)

Conversion rates	Australia	Austria	Finland	Italy	Norway	Sweden	United Kingdom	United States
<u>1982</u>								
Exchange rates a/	0.98	17.06	4.82	1 353	6.45	6.28	0.57	1.00
PPPs for GDP b/	1.03	16.10	5.30	983	7.30	5.97	0.54	1.00
The Group's military PPPs	1.45	13.56	4.00	679	7.14	7.10	0.61	1.00
<u>1981</u>								
Exchange rates a/	0.87	15.93	4.32	1 137	5.74	5.06	0.49	1.00
PPPs for GDP b/	0.99	16.10	5.2	892	7.11	5.88	0.54	1.00
The Group's military PPPs	1.44	13.58	3.98	661	7.09	7.13	0.61	1.00
<u>1980</u>								
Exchange rates a/	0.88	12.94	3.73	856	4.94	4.23	0.43	1.00
PPPs for GDP b/	0.99	16.50	5.08	821	6.79	5.85	0.53	1.00
The Group's military PPPs	1.34	14.09	4.11	567	6.93	7.28	0.58	1.00

a/ Exchange rates are the yearly average dollar rates as published by the International Monetary Fund; see International Financial Statistics, April 1985, IMF, Washington, 1985).

(b) For PPPs for GDP constructed by the Organization for Economic Co-operation and Development, see National Accounts, Main Aggregates, 1960-1983, vol. 1 (OECD, Paris, 1984), pp. 123-30.

121. As for the two types of PPPs, it may, however, be more surprising to find that these two sets of figures show important differences, although these differences remain about the same for all the three years. This should indicate that relative prices of military goods and services and relative weights of subcategories of such items differ largely among countries in a different way than is the case for those prevailing in the civilian sectors of their respective economies. In view of both the special pricing practices with regard to conscripts and of the very special economic conditions in which defence industries are generally operating, one may not be too surprised to find substantial differences between civilian and military PPPs. If this is generally expected to be the case, which is strongly supported by the results of this exercise, there should be good reason to construct PPPs with specific relevance to military expenditures especially in connection with negotiations to reduce such expenditures, as negotiating Parties would supposedly be concerned with the relative purchasing power of their military expenditures for which they would want to have accurate information.

122. Based on the military expenditures reported by participating States and on the military PPPs presented in this report, the Group proceeded to recalculate the same military expenditures at international prices, the result of which is shown in table 13. This table shows a comparison among countries of their military expenditures on a disaggregate level which is not possible to find in any other publication.

123. The unit of table 13 is the international dollar, which is defined to have the same purchasing power over all of military expenditures as the United States dollar in 1982. ^{8/} The entries in table 13 can be added down the columns and across the rows, and represent quantity comparisons of each of the aggregates presented. In addition to providing comparability among the countries, the volume measures of table 13 can be presented so as to shed light on the relative prices of the different types of military spending as follows. In table 14, each country's components of military expenditure as shown in table 13 have been divided by the total for the country in order to form a percentage distribution which is given in the columns headed "international dollars". The same percentage distribution has been calculated using expenditures in national currencies. A comparison of the two percentages gives an idea of how much national price relationships differ from the average price structure of the group. The fact that there are large differences in these percentages suggests why use of a single conversion factor for all military expenditure (like the exchange rate) may be misleading when it is desired to compare any of the subaggregates.

124. The relationship between military expenditures of the United States and other participating States as obtained from table 13 are compared in table 15 with corresponding figures from other internationally known sources of information on military expenditures. This table shows that the ratios of the military expenditures of participating States according to the findings of this Group are different and, in some cases, even very different from the ratios derived from other sources. This is another illustration of the value of constructing military PPPs for international comparisons of military expenditures.

Table 13. Military expenditures of participating States at international prices of 1982

(Millions of international dollars)

	Australia	Austria	Finland	Italy	Norway	Sweden	United Kingdom	United States
Military personnel	893.9	530.1	562.9	9 582.4	673.0	866.9	4 943.3	50 138.4
Civilian personnel	404.3	257.3	100.0	1 371.1	249.7	329.6	5 702.1	21 937.4
Operations and maintenance	1 176.3	150.4	216.2	2 148.6	336.6	660.0	8 585.7	44 723.7
Total operating costs	2 474.5	937.8	879.1	13 102.1	1 259.3	1 856.5	19 231.1	116 799.5
Procurement and construction	216.6	44.2	135.5	905.0	162.8	450.2	1 925.2	52 843.7
Research and development	112.6	-	1.6	147.1	14.0	264.8	3 338.4	14 759.8
Total military expenditures	2 803.7	982.0	1 016.2	14 154.2	1 436.1	2 571.5	24 494.7	184 403.0

Table 14. Percentage distribution of participating States' military expenditures as expressed in national currencies and in international dollars respectively

PARTICIPATING STATES CATEGORIES	AUSTRALIA		AUSTRIA		FINLAND		ITALY		NORWAY		SWEDEN	
	National currency	Inter-national dollars										
Personnel	54.4	46.3	68.3	80.2	45.2	65.2	57.0	77.4	50.7	64.3	42.5	46.5
Operations and maintenance	28.6	42.0	14.6	15.3	23.4	21.3	20.3	15.2	27.2	23.4	21.0	25.7
Procurement and construction	13.8	7.7	17.1	4.5	31.2	13.3	21.7	6.4	21.2	11.3	28.7	17.5
Research and development	3.2	4.0	0.0	0.0	0.2	0.2	1.0	1.0	0.9	1.0	7.8	10.3
Total	100	100	100	100	100	100	100	100	100	100	100	100

Table 15. Participating States' military expenditures of 1982
in per cent of the military expenditure of the
United States

Source of information	United States Arms Control and Disarmament Agency (USACDA)	Stockholm International Peace Research Institute (SIPRI)	International Institute for Strategic Studies (IISS)	Organisation for Economic Co-operation and Development (OECD)	Group of Experts
Type of conversion factor	Exchange rates	Exchange rates	Exchange rates	GDP PPPs	Military PPPs
<u>Participating States</u>					
Australia	2.48	2.24	2.56	2.12	1.52
Austria	0.58	0.41	0.43	0.49	0.53
Finland	0.51	0.46	0.44	0.45	0.55
Italy	6.24	4.98	4.63	5.32	7.68
Norway	1.04	0.93	0.86	0.78	0.78
Sweden	2.36	1.98	1.61	1.66	1.39
United Kingdom	15.80	13.94	12.37	15.02	13.28
United States	100	100	100	100	100

D. Possible further improvements

125. Concerning the general statistical method used by the Group, no major improvements could be expected in view of the fact that this method has been already tested and refined in such intensive efforts as those of the United Nations International Comparison Project and of the Statistical Office of OECD in their construction of civilian PPPs. However, some improvements are easily conceivable with regard to the practical application of this method for the construction of military PPPs.

126. The amount and quality of information received in the course of the Group's exercise could be improved, although considerable efforts were made by the contacts of participating States in order to provide the Group with reliable statistical data. Further efforts could, however, be made both to supply more data and to define better the information on prices and quantities requested. This could, for instance, be done by means of more precise and better elaborated questionnaires.

127. The price indexes constructed by the Group for the category of personnel seem to be fairly accurate and not greatly in need of improvement. However, the comparison between conscripted and enlisted personnel involve specific problems as the results of such comparisons depend much on the particular approach which is selected. The Group is of the opinion that it has solved the problem in an appropriate way, but it has not had the time to deal with this complex matter in all its aspects. Further consideration of the problem might therefore help to arrive at better and more reliable results.

128. Although the construction of price indexes and PPPs for the category of operations and maintenance did not seem to present any major difficulties different from those existing in the civilian sector, the Group felt that its questionnaire should have included a larger number of items. This would probably have contributed to an improvement of the results.

129. For the category of procurement, it has not been possible for the Group to construct price indexes for all participating States owing to a lack of data. Not only are data for this category generally scarce, but the particular nature of weapon systems and other items of military equipment often present special difficulties in the comparison of such items and of their prices.

130. One particular problem has to do with the calculation of unit prices which in most cases depend on several different factors such as the production cycle and the imputation of fixed costs, as described in chapter II. Another problem, as already noted above, is that of handling changes in quality over time. All these factors constitute difficulties not only with regard to the construction of price indexes but also with regard to PPPs. The Group has tried its best to overcome these difficulties but is, at the same time, conscious of the fact that it may not have found in all cases the most appropriate solutions. It would, for instance, be worth considering the use of methods by which so-called theoretical prices are estimated with the help of regression analysis relating the price of an item to its main characteristics. The Group felt that it could not attempt to apply such a method. However, if more time and effort were devoted to the difficulties of

comparing expenditures on military procurement, it would probably be possible to arrive at more accurate results.

131. In the calculation of PPPs for procurement, the task of matching items from different countries was made difficult by several factors. The Group relied on the suggestions of States for the items to be priced and, potentially, to be matched. These turned out to be a small sample of all those produced or procured, which reduced the opportunity to find appropriate matches. Further, the resources readily available to the Group, as well as, perhaps, to the participating States' contacts, did not include specialized expertise such as would be desirable for making international comparisons of procurement items. Rather than request the participating States to suggest international pairings of items, as was done, it might be preferable in future efforts to obtain appropriate expertise, to research the items known to be in production on the basis of the rather extensive international sources and reference works and to seek out items appearing to be comparable at an initial stage, which could then be adjusted in the light of the comments of States and for which prices would be sought.

132. It would also be desirable to obtain a greater representation of domestically produced items in the sample of matched prices. In the present exercise, many of the acceptable price comparisons among countries turned out to be for items with the same national origin, but domestic in one case and imported in another. Thus, imported procurement items may be overrepresented in the Group's sample.

133. In the context of future efforts toward procurement PPPs, whether or not made in the course of negotiations on a reduction of military expenditures, it may be supposed that the Parties would be both able and willing to make the necessary efforts in order to reach satisfactory solutions.

134. As mentioned earlier, the Group's questionnaire on the category of construction did not prove adequate for its purpose of collecting appropriate information. The Group had therefore to use civilian construction price indexes for military construction submitted directly by participating States. It is, however, not likely that this has had more than a very minor impact on the aggregate results achieved by the Group, as the category of construction is rather small in most countries' military expenditures and as no major differences in unit costs should be expected to prevail between civilian and military construction. Some improvements might, however, be obtained if specific military construction price indexes were produced.

135. Concerning the category of research and development, the Group encountered several difficulties in its endeavours to specify appropriate items for which prices could be requested. In view of this, it chose to apply a simple method through which it used prices for a selected number of items within the operating cost category on the assumption that those could fairly well be applied to similar input items in the research and development area. A more elaborate method might prove to yield better results but it is at present difficult to define such a method.

136. From the standpoint of possible future negotiations on the reduction of military expenditures, the greatest improvement over the achievements of the present exercise would, undoubtedly, be afforded by a more representative sample of participating States having diverse budgeting and accounting systems. The present sample of participants includes four members of the same military alliance and all eight participants are developed market economies.

137. To summarize this chapter, the Group is pleased to present the results it has achieved but feels that there would still be room for those results to be improved if more time and efforts had been or could be devoted to deal with the above-mentioned problems and difficulties. Although the results of this exercise in terms of military price indexes and PPPs could be improved, they are, nevertheless, in the Group's opinion much better to use for the comparison of participating States' military expenditures than general civilian price indexes and official exchange rates. The Group wants also to underline that another important result of this exercise is the experience and knowledge which have been gained through it and which should - in spite of the limitations imposed by the small number of participating States - prove to be useful in the event of future international negotiations on agreements to reduce military expenditures.

CHAPTER V

THE USEFULNESS OF THIS AND EARLIER STUDIES FOR FUTURE NEGOTIATIONS ON AGREEMENTS TO REDUCE MILITARY EXPENDITURES

138. As has been stated in detail in the introduction, this Group's report belongs to a series of United Nations reports prepared by successive groups of experts to facilitate agreements on a reduction of military expenditures which would result, inter alia, in a release of resources that could be used for economic and social development, particularly for the benefit of the developing countries.

139. The Group believes that it is useful at this time to briefly review how the present study, as well as the entire series of studies, contributes to the reaching of such agreements and to consider what additional issues might deserve to be examined.

140. When negotiating agreements to reduce military expenditures, it may be necessary, as a first step, to define the concept of "military expenditures" itself. In practice, this implies that the Parties participating in such negotiations would have to agree on what kind of military expenditures should or should not be subject to such negotiations. Another necessary task pertaining to negotiations to reduce military expenditures would be to define the concept of "reduction" and to agree on appropriate rates of reduction.

141. In view of the different outlooks on this and related matters, as well as of the diverse budgeting and accounting systems and the different development levels co-existing in the world today, there is no obvious solution to these and other related questions. Moreover, even if we had a clear and common understanding as to

the meaning of "military expenditures", Parties might, for different reasons, choose to limit negotiations only to certain components of these expenditures.

142. In any case, it would be necessary to discuss these matters at the very outset of negotiations in order to decide which expenditures should be reduced and thus subject to negotiation. At the same time, it would be equally important to determine how these expenditures should be accounted for and how and when they should be reported among the Parties. Appropriate solutions to these questions might facilitate negotiations and help the Parties to reach agreements to reduce their military expenditures.

143. In this context, the work carried out by earlier groups of experts which led to the adoption by the United Nations of an international system for standardized reporting of military expenditures deserves a great deal of attention. Since its adoption in 1980, an increasing number of Member States have reported their military expenditures using the international reporting instrument and at present more than 30 States have done so. It would be desirable to continue to widen the use of the system for standardized reporting of military expenditures, since this is likely not only to expand the general knowledge of the matter and to increase international confidence which would result from a widespread participation by States in this system, but also because it might facilitate future negotiations on a reduction of military expenditures.

144. Moreover, military expenditures would have to be understood in real terms, taking into account and allowing for inflation rates of the negotiating Parties, both overall and with regard to the military sector itself. Any agreement to reduce military expenditures would, therefore, need to deal with military expenditures in constant prices. This requirement is of a growing importance the longer the period is over in which the reductions should be carried out.

145. Thus, the Group has endeavoured to explore the different kinds of methodological questions involved in intertemporal comparisons, suggesting ways in which they might be resolved. This has been carried out with future and practical negotiations in mind.

146. Although a country's military expenditures may not fully reflect its military capability or even less its degree of national security, it might be presumed, however, that these three elements are closely linked together. Negotiating Parties would undoubtedly have a special interest in comparing among themselves their levels of military expenditures. Therefore, not only intertemporal comparisons would have to be made, but there would also be a need for international comparisons involving slightly different methodological problems.

147. Thus, the Group has dealt with these problems at some length trying by means of the same practical exercise to single out the difficulties and the possibilities of constructing appropriate tools for international comparisons of military expenditures. It has also tested and suggested a number of methods that might be used by negotiating Parties to arrive at sufficiently accurate comparisons, thereby serving the purpose of facilitating future negotiations.

148. Until now, United Nations groups of experts working in this field under appropriate General Assembly resolutions have concentrated mainly on statistical, technical and methodological issues which are of the greatest importance in the context of possible negotiations. As it has been pointed out before, there are, however, other aspects that are equally important.

149. Two such aspects are, for instance, the important impact of political elements in a context of negotiations and possible modalities of agreements to reduce military expenditures.

150. There is, for instance, no doubt that the political and technical aspects of international and intertemporal comparisons of military expenditures are closely and continuously interrelated. Furthermore, the political aspects may even be the fundamental ones. The Parties must show the political will and firm determination to arrive at agreed solutions and to provide the data and other assistance needed for comparison and verification purposes. Since several procedures for constructing appropriate price indexes and conversion rates may be used, a common understanding would be needed on the construction of relevant military deflators and PPPs. Given such an understanding, it should be possible to resolve the technical problems in a way satisfactory to all Parties. It might be said, in fact, that beyond a certain point a "technical" issue becomes "political" and vice versa.

151. As for the modalities of agreements to reduce military expenditures to which above-mentioned tools could be applied, such agreements could be bilateral, regional, multilateral or universal. They could include all members of opposing defence organizations or only States of major economic and/or military significance.

152. No matter which of these modalities is being contemplated, agreements would need the kind of definitions and comparability standards that have been prepared by this and earlier groups of experts. Common acceptance of definitions as well as of concepts concerning measurement, comparability, verification and other related matters would constitute necessary conditions for an agreement on a reduction of military expenditures.

153. Although these and other related issues may be of both a technical and political character and of such a nature that they can only be finally resolved through actual negotiations, they may, nevertheless, in a preliminary stage, deserve to be examined. There is, undoubtedly, a large number of such issues, from which the Group has chosen the following examples:

(a) Main obstacles to progress towards negotiations and the linkage between "technical" and "political" elements:

- (i) Which are, at present, the main "technical" and "political" difficulties in the way of making progress towards obtaining international agreements to reduce military expenditures?

- (ii) What is the nature and scope of the interrelationship between "technical" and "political" elements with regard to agreements to reduce military expenditures?
 - (iii) In which way might agreements to reduce military expenditures be related to other disarmament agreements?
- (b) Framework of negotiations:
- (i) Should a negotiation in the first place involve a very limited number of States such as the two major Powers or the most important military Powers or should it involve all States belonging to opposing defence organizations?
 - (ii) Which other sets of countries might start negotiations, perhaps in a regional context?
 - (iii) In which way might developments outside of negotiating Parties affect their basis for negotiation and how could such developments be taken into account?
 - (iv) In reduction of military expenditures, what would be the role played by the developing countries?
 - (v) Should negotiations on agreements to reduce military expenditures take place within or without the United Nations framework or both?
 - (vi) What policies should the United Nations carry out in order to encourage negotiations of this kind?
- (c) Modalities of agreements:
- (i) What kinds of expenditures would preferably be subject to negotiation, military budgets or actual outlays?
 - (ii) Would there be a need for additional agreements which provide for reductions not in money terms but in physical terms, such as the number of tanks, aircraft, etc.?
 - (iii) Could a negotiation to reduce military expenditures be limited to only part of them and, if so, which alternatives seem to be the most feasible ones?
 - (iv) On what basis should reductions be determined, should they have to be equal in an absolute or relative sense or could they be based on some other criteria?

(d) Verification:

- (i) What type of information concerning military efforts and expenditures would negotiating Parties have to exchange among themselves for the purpose of facilitating their negotiations and for their reaching and subsequently supervising of an agreement?
- (ii) At which points in time would this information have to be made available?
- (iii) Which provisions could be made in the agreement and which measures could be taken to ensure a both satisfactory and acceptable verification?

(e) Reallocation of resources:

- (i) How could real resources released through reduction of military expenditures be efficiently used for civilian purposes?
- (ii) How could a reduction of military expenditures be best channelled into economic and social development, especially for the benefit of the developing countries?

(f) Arms transfers:

- (i) How should arms transfers be dealt with in connection with negotiations on agreements to reduce military expenditures?

154. Although operational solutions to many of these issues and questions may only be reached in the context of negotiations, systematic discussions within the framework of the United Nations might help to clarify matters and would presumably promote progress towards negotiations.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

155. The Group of Experts concludes:

(a) That the construction of useful instruments for intertemporal and international comparisons of military expenditures, namely military price indexes and PPPs, is feasible, given a sufficient availability of relevant statistical information and that good results can be obtained with a relatively limited amount of data, provided that necessary efforts are made to select and collect the information and to make the appropriate comparisons;

(b) That military price indexes and PPPs tend usually to be different from civilian or general price indexes and exchange rates, respectively;

(c) That the military measures reflect the real value of military expenditures better than the civilian, and that, therefore, their use is preferable

for measuring and comparing real military expenditures in the context of international negotiations on agreements to reduce such expenditures;

(d) That the results in terms of price indexes and PPPs as obtained by this Group could be further improved if more time and efforts were devoted to the selection, collection and evaluation of information from participating States;

(e) That the experience gained through this exercise has been limited largely on account of a lack of participation by States with different budgeting and accounting systems and by countries at very different levels of economic development, and thus;

(f) That valuable additional experience could be gained, if a larger number of countries including in particular such countries as referred to above would volunteer to participate, and therefore;

(g) That, if such conditions of wider participation should evolve, a further exercise of the present kind would be worth consideration;

(h) That there is at present a great reluctance on the part of most Member States to divulge information on characteristics and prices of military goods and services. However, States participating in future negotiations on agreements to reduce military expenditures might well be more willing to exchange more such information among themselves compared to what they are willing to publicize under present circumstances;

(i) That this exercise belongs to a series of reports aiming at the reduction of military expenditures whereby resources would be released for economic and social development, particularly to the benefit of the developing countries. Thus, this exercise also bears a clear relation to the endeavours made by the United Nations to explore the link between disarmament and development, as in both cases the aim is to obtain a release of resources through a reduction of military efforts in real terms;

(j) That the conclusions made by the preceding Group of Experts (A/S-12/7, annex) 4/ still hold and that, in particular, the following ones have even been reinforced by the experience and the results gained through this Group's exercise:

- (i) The political and technical aspects of international and intertemporal comparisons of military expenditures are closely and continuously interrelated. Furthermore, the political aspects may even be the fundamental ones. The Parties must show the political will and firm determination to arrive at agreed solutions and to provide the data and other assistance needed for comparison and verification purposes;
- (ii) As in the case of other disarmament agreements, a verification system will be necessary in order to provide assurances that all Parties are in compliance with the agreement;
- (iii) Negotiations on a reduction of military expenditures should proceed on the basis that their results would not diminish any State's security;

- (iv) Negotiations on reduction of military budgets could lead to agreements among various participating States. Such agreements could be concluded on a global, regional or subregional level, among nuclear-weapon States, among other militarily significant States or among any other States whether they are members of military alliances or not;
- (v) The successful demonstration of the feasibility of constructing military price indexes and PPPs for different States would contribute much to preparing the ground for future negotiations on a reduction of military expenditures;

(k) That this Group as most other preceding Groups in this field has been devoted to primarily technical matters. However, there are also, as shown in chapter V, other important aspects of the question of reducing military expenditures which would deserve careful attention.

156. On the basis of the above conclusions, the Group recommends:

(a) That the consideration of technical and other aspects of problems related to agreements to reduce military expenditures should be continued and that appropriate measures should be taken in order to promote and facilitate international negotiations on such agreements;

(b) That all Member States should be invited to express their views on the present report, including the prospects of wider participation, in particular by countries with different budgeting and accounting systems and at very different levels of economic development, as well as on all matters dealt with in this report and to suggest further steps or measures with a view to promoting and facilitating future international agreements to reduce military expenditures;

(c) That a report on the above matters should be submitted by the Secretary-General to the General Assembly at its forty-first session (1986);

(d) That all Member States, in particular the nuclear-weapon States and other militarily significant States, should be urged:

- (i) To help create the necessary conditions for fruitful negotiations on agreements to reduce military expenditures;
- (ii) To recognize that in this process and in the course of such negotiations a reasonable availability and exchange of statistical data would be required.

On this basis, Member States should start negotiations as soon as possible.

Notes

1/ Reduction of the Military Budgets of States Permanent Members of the Security Council by 10 per cent and Utilization of Part of the Funds Thus Saved to Provide Assistance to Developing Countries, A/9770/Rev.1 (United Nations publication, Sales No. E.75.I.10).

2/ Reduction of Military Budgets: Measurement and international reporting of military expenditures, A/31/222/Rev.1 (United Nations publication, Sales No. E.77.I.6.).

3/ Reduction of Military Budgets: International reporting of military expenditures, A/35/479 (United Nations publication, Sales No. E.81.I.9).

4/ Reduction of Military Budgets - Refinement of international reporting and comparison of military expenditures, A/S-12/7 (United Nations publication, Sales No. E.83.IX.4).

5/ Multilateral Measurements of Purchasing Power and Real GDP, Statistical Office of the European Communities, 1982.

6/ Price indexes for subcategories of procurement, construction and research and development were not constructed by the Group.

7/ If PPP_{A82} is the PPP of country A in 1982, with respect to the numéraire country B, then if $Pind_{A80}$ is the price index of country A in 1980 and if $Pind_{B80}$ is the price index of country B in 1980, you get the following general formula to arrive at the PPP of country A in 1980:

$$\frac{PPP_{A82} \cdot Pind_{A80}}{Pind_{B80}} \quad \text{Applying this formula, as for instance to}$$

Australia, it will yield the following result:

$$1.458 = \frac{100}{129.8} = 1.354$$
$$\frac{100}{120.5}$$

8/ This definition is analagous to the use of international dollar in the United Nations International Comparison Project, except that in the latter, the purchasing power is defined over all of the gross domestic product. For a reference, see I. B. Kravis, A. Heston and R. Summers, World product and income: international comparison of real gross domestic product (Baltimore, Johns Hopkins University Press, 1982), p. 7.

APPENDICES

APPENDIX I

Questionnaire on conscription

Group of Experts on the
Reduction of Military
Budgets

Questionnaire on conscription

Country: _____

Name of contact: _____

Address: _____

Telephone: _____

Please return this questionnaire to the Group's chairman:

Hans Christian Cars
Försvarsdepartementet (Ministry of Defence)
103 33 STOCKHOLM, Sweden.
(Telephone: (46)-8-763 26 40 or
(46)-8-62 36 22)

1. Numbers of conscript man-years in 1982

Please give the numbers in terms of man-years distributed among different ranks of conscripts and types of privates according to their respective lengths of service. It is desirable to receive the data for personnel in basic training separate from those for personnel in refresher training as the modalities of payments may be quite different between these two categories.

Number of man-years

Rank	In basic training	In refresher training
Captains		
Lieutenants		
Second lieutenants		
Staff sergeants		
Sergeants		
Corporals		
Privates:		
(a) With less than 6 months of service		
(b) With 6-12 months of service		
(c) With more than 12 months of service		

2. Financial remuneration in 1982

Please give data concerning the daily direct pay to conscripts in basic and refresher training. (These pays multiplied by 365 and the number of man-years for each category would presumably add up to total cash allowances for conscripts in 1982).

Daily pay to conscripts

(Unit of account =)

Rank	In basic training	In refresher training
Captains		
Lieutenants		
Second lieutenants		
Staff sergeants		
Sergeants		
Corporals		
Privates:		
(a) With less than 6 months of service		
(b) With 6-12 months of service		
(c) With more than 12 months of service		

3. Expenditures on conscripts in 1982

(a) Please give expenditure data for the following cost categories distributed, where possible, among conscripts in basic and refresher training.

(Unit of account =) Cost category	In basic training	In refresher training
Cash payments (same as in question 2 above)		
Travel allowances		
Medical care		
Other economic benefits		
Food costs, including the preparation of the meals		
Accommodation (heating and maintenance of casernes)		
Clothing and cleaning		

(b) Please adjust the expenditure data in column 13 of your attached filled-in matrix on the assumption that all above-mentioned expenditures would be reallocated to the line 1.1.1 conscripts.

APPENDIX II

List of selected items and data used for the construction of PPPs for operating costs

(Figures are given in each country's national currency; for Italy the unit of account is 1,000 lira) (Figures for the item combat uniform are PPPs based on price data for a selected number of components such as socks, boots, helmets, etc.)

Input data	AUSTRALIA	AUSTRIA	FINLAND	ITALY	NORWAY	SWEDEN	UNITED KINGDOM	UNITED STATES
** Personnel **								
112 1 282 Colonels	58 520.0	354 918.0	186 200.0	30 400.0	252 066.0	190 000.0	27 102.0	40 682.0
112 2 282 Majors	46 228.0	263 570.0	134 330.0	23 300.0	201 619.0	133 000.0	17 656.0	30 388.0
112 3 282 Captains	39 009.0	216 762.0	117 040.0	20 500.0	165 635.0	123 000.0	14 028.0	25 931.0
112 4 282 Lieutenants	31 576.0	236 500.0	103 740.0	15 440.0	140 109.0	112 000.0	11 187.0	22 088.0
112 5 282 Staff sergeants	29 988.0	201 377.0	62 510.0	13 100.0	0.0	0.0	12 100.0	15 095.0
112 6 282 Sergeants	27 308.0	170 933.0	78 497.0	0.0	119 276.0	0.0	11 410.0	13 230.0
112 7 282 Corporals	24 588.0	156 769.0	78 497.0	0.0	0.0	0.0	10 061.0	11 969.0
112 8 282 Enlisted privates and conscripted privates with more than six months of training	21 640.0	307 992.0	18 550.0	3 742.0	47 484.0	68 180.0	6 768.0	11 290.0
112 9 282 Conscripted privates with less than six months of training	0.0	88 992.0	17 221.0	3 587.0	37 043.0	52 073.0	0.0	0.0
** Civilian personnel **								
113 1 282 Typists	15 568.0	124 213.0	70 156.0	11 400.0	96 474.0	103 000.0	4 855.0	14 729.0
113 2 282 Administrative civil servants	20 997.0	196 570.0	111 986.0	12 300.0	126 612.0	123 000.0	8 340.0	24 187.0
113 3 282 Car mechanics	0.0	127 651.0	67 218.0	11 400.0	96 474.0	114 000.0	6 402.0	24 971.0
113 4 282 Aircraft mechanics	0.0	140 417.0	80 066.0	11 400.0	117 425.0	117 000.0	6 402.0	26 271.0
113 5 282 Computer engineers	27 200.0	216 227.0	142 124.0	12 300.0	138 310.0	142 000.0	9 982.0	28 321.0
113 6 282 Warehouse workers	14 258.0	141 459.0	71 820.0	10 000.0	96 474.0	103 000.0	5 358.0	15 447.0
113 7 282 Kitchen workers	14 258.0	141 459.0	68 761.0	10 000.0	96 474.0	103 000.0	5 045.0	16 476.0
113 8 282 Medical doctors	0.0	250 159.0	191 121.0	0.0	219 855.0	280 000.0	0.0	67 493.0
113 9 282 Medical nurses	20 034.0	156 721.0	83 391.0	0.0	112 910.0	124 000.0	0.0	26 382.0
11310 282 Doctors of science	59 615.0	196 570.0	163 271.0	13 300.0	185 089.0	158 000.0	9 243.0	43 054.0
** Operations and maintenance **								
121 1 182 Meals	10.0	68.0	21.0	3.4	30.8	42.9	1.9	0.0
121 2 182 Combat uniforms	1.012	16.40	5.46	1.14	7.75	6.67	0.896	1.0
121 3 182 Regular petrol	320.0	9 280.0	3 470.0	495.1	3 559.0	3 760.0	409.0	254.0
121 4 182 Diesel fuel	280.0	10 150.0	2 440.0	470.0	2 048.0	2 330.0	378.0	262.0
121 5 182 Aircraft fuel	310.0	9 300.0	1 300.0	400.0	2 000.0	1 870.0	279.0	256.0
121 6 182 Light beating oil	0.0	6 105.0	1 480.0	562.0	2 054.0	1 150.0	242.0	209.0
121 8 182 Field rations	39.0	0.0	180.0	77.3	181.0	190.0	26.7	0.0
122 1 182 Army workshop hour	18.0	265.0	0.0	15.0	47.75	144.0	8.5	0.0
122 3 182 Airforce workshop hour	26.0	0.0	0.0	15.0	72.0	117.0	8.0	0.0
12210 182 Car mechanics	0.0	127 651.0	67 218.0	11 400.0	96 474.0	114 000.0	6 402.0	24 971.0
12211 182 Aircraft mechanics	0.0	140 417.0	80 066.0	11 400.0	117 425.0	117 000.0	6 402.0	26 271.0
123 1 182 Postage	-270	4.0	1.2	0.3	1.920	1.8	0.140	0.2
123 2 182 Phone calls	0.1	1.5	0.2	0.1	0.9200	0.2	0.0490	0.180
123 3 182 Rail travels	-0.60	9.6	0.2	0.03	0.540	0.280	0.0340	0.091
123 4 182 Air travels	-230	5.4	0.83	0.175	0.88	0.93500	0.1	0.093
123 5 182 Per diems	65.0	298.0	318.0	60.0	752.0	495.0	27.9	75.0
12411 182 Rent	0.0	60 000.0	43 200.0	12 000.0	151 000.0	67 500.0	28 800.0	8 607.0
** Components of a combat uniform **								
121 9 182 Socks	2.5	0.0	13.85	3.420	20.39	17.0	1.74	1.42
12110 182 Leather boots	41.0	1 255.0	264.6	61.950	219.43	330.0	26.3	37.3
12111 182 Helmets	0.0	228.0	124.4	13.8	145.0	145.0	30.090	24.68
12112 182 Shirts	0.0	177.0	0.0	15.34	68.750	65.0	10.79	16.08
12113 182 Raincoats	0.0	433.0	103.0	57.82	231.0	120.0	0.0	0.0
12114 182 Battle dresses	0.0	792.0	299.8	28.32	944.790	470.0	49.32	60.2

APPENDIX III

Group's instructions to respondents accompanying its
questionnaire on procurement and construction

The interpretation and use by the contacts of this questionnaire should be facilitated by the following explanations and guidelines:

Explanation of terms

- (a) The matrix is the one contained in the instrument for standardized international reporting of military expenditures which was attached to an earlier communication from the Group;
- (b) A main category in that matrix is the resource cost category on the one-digit level such as operating costs, etc.;
- (c) A sub-category is the resource cost category on the two-digit level such as personnel, operations and maintenance, etc.;
- (d) A sub-sub-category is the resource cost category on the three-digit level such as conscripts, aircraft and engines, etc.;
- (e) A cell is formed by the intersection of a row and of a column in the matrix. It is the space supposed to be filled in with requested information on military expenditures. Cells appear on all levels of aggregation;
- (f) A type is a certain class of products and services which have important common characteristics. In the case of the sub-sub-category, aircraft and engines, for instance, types may be fighter aircraft, bombers, transport aircraft, etc.;
- (g) An item is a specific model within a type. In the case of aircraft and engines, an item could, for instance, be a particular fighter aircraft such as F5, F16, etc.;
- (h) A unit is one single entity of a particular item, such as one F16-fighter aircraft;
- (i) A characteristic is a quality used to describe a particular item with special regard to its military utility. Qualities of little or no importance to the military utility of an item should not be regarded as characteristics;
- (j) Military expenditures are those that are to be reported within the United Nations system for standardized international reporting of military expenditures. Such expenditures may differ from the social costs involved because of several reasons, such as non-market wages to conscripts, abnormal profits in the defence industry, State subsidies and others;

(k) A unit price is the total expenditures made for an item divided by the number of units. For further specification, see paragraph (p), below. The price may not reflect the social costs;

(l) The period of the exercise covers the three fiscal years most closely corresponding to the calendar years 1980-1982.

Guidelines

(a) Information should be restricted to such items that were actually delivered during, at least, one of the three fiscal years within the period of the exercise. You need not report on more than four items within each type. In case you would have more than four items to report on, please select those items on which you spent most;

(b) Price information to be submitted should be actual unit prices where these are readily available, or estimated unit prices in cases where these can be prepared with a reasonable effort and with relative accuracy (that is, within an expected margin of plus-or-minus 10 per cent);

(c) Since for a number of items unit prices may not be readily available or relatively accurate estimates cannot be made with a reasonable effort, you may be requested, upon consultation with representatives of the Group, to submit such information at a later stage;

(d) To arrive at comparable estimates on unit prices for domestically procured items, you are requested to proceed as follows:

- (i) Calculate all expenditures for investment in production facilities (excluding those on research and development), which are attributable to the item in question and made before the period of the exercise. To take into account the effects of inflation on such expenditures, you are requested to use an appropriate index and to indicate which index you have used;
- (ii) Establish the number of units that according to plans are going to be produced;
- (iii) Divide for each of the three years within the period of the exercise the sum of the expenditures for investment as calculated according to (i) above, by the total number of units as established according to (ii);
- (iv) Calculate for each of the three years within the period of the exercise the current procurement expenditures per unit, namely, the procurement expenditures of one year divided by the number of units that were procured that same year;
- (v) Add for each of the three years within the period of the exercise the unit procurement expenditures as calculated according to (iv) to the figure for each of the same years as obtained according to (iii) and you will arrive at the unit price for each of the three years.

(e) The characteristics given in the questionnaire have been selected with the purpose of enabling meaningful comparisons. If you consider that other characteristics are also important for comparison purposes, you are requested to add them to the ones already listed and submit information with regard to those characteristics as well;

(f) As mentioned above, the social costs of an item may be much different from the amount spent on the item in question. You are therefore requested to indicate for which items you regard this to be the case.

APPENDIX IV

Group's questionnaire on military research and development

Name of country: _____

Name of the contact: _____

Address: _____

Telephone: _____

You are kindly requested to complete and return this questionnaire not later than 10 November 1984, to:

Group of Experts on the Reduction of Military Budgets
c/o Mr. F. Alem,
United Nations
Department for Disarmament Affairs
New York, N.Y. 10017
United States of America

and to send a copy to:

The Group's Chairman
Mr. Hans Christian Cars,
Ministry of Defence/PBS,
S-103 33 Stockholm,
Sweden

Part I

1. Does your country produce price indices for military or civilian research and development (R & D)?

Military		Civilian	
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	<input type="checkbox"/>	Yes	<input type="checkbox"/>
	<input type="checkbox"/>	No	<input type="checkbox"/>

2. If yes, would you please describe in a separate paper the method used to construct such price indices?

3. In your opinion, how well would the price indices for civilian R & D, if available, reflect price changes with regard to military R & D?

Very well

Fairly well No study has been made on this question

Poorly

4. Please give, for 1982, the share of military R & D:

(a) Carried out within the military sector _____

(b) Purchased from the civilian sector _____

5. What was the distribution of expenditures (in per cent) on military R & D in 1982?

Expenditures	Within the military sector	Purchased from the civilian sector	Total
1. Personnel			
2. Current expenditures			
3. Equipment			
4. Construction			
5. Total	100	100	100

6. Which were the expenditures in 1982 on the main categories of personnel such as researchers, technicians, etc.? Please indicate the unit of account (millions, thousands, etc.).

Categories	Man-hours	Expenditures
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

7. Which were the main types of goods and services such as computers, books, microscopes, etc. purchased for the military R & D in 1982?

Items	Expenditures
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

8. This questionnaire, and in fact all known efforts to prepare price indices for military R & D, have dealt solely with a set of inputs to the R & D activity. In the case of other objects of military expenditure, price indices and parities deal with kinds of output - personnel or maintenance services, weapons and equipment, facilities, etc. Although these are not yet an ideal kind of final output, such as "capability to exert military force", they are one step removed and represent intermediate kind of output with inputs of their own. In the case of R & D, there is no comparable intermediate output in common use that can serve the same purpose. Indices and parities based on prices of inputs that are twice removed from the main output, military force, are less valid for comparison purposes. This is especially true for cross-national comparisons - namely, purchasing power parities - because the same set of inputs may be applied with widely differing productivity and represent differing "output" in different countries. It has been suggested that perhaps a means can be found to define standardized hypothetical research and development objectives such that different States could estimate their required set and amounts of inputs for each objective. In this way, the price of such a standard objective could be compared in terms of costs of inputs required.

APPENDIX V
 Data obtained by means of the Group's questionnaire on conscripted privates

Participating States	Yearly costs per conscript a/		Number of conscript man-years		Expenditure redistribution b/	
	with < 6 months of training	with ≥ 6 months of training	< 6 months	≥ 6 months	Military personnel	Operations and maintenance
Austria	88 992	307 992	25 443	1 744	+1 796	-1 796
Finland	17 221	18 550	5 822	13 734	+403	-403
Italy	3 587 000	3 742 000	135 000	143 000	+732 000	-732 000
Norway	37 043	47 484	9 777	12 993	+333	-333
Sweden	52 073	68 180	21 000	17 886	+1 065	-1 065

a/ In national currencies.
 b/ In millions of each respective national currency.

APPENDIX VI

United States input file

Cost category/item	Prices or indices			Weights 1982	Indices (1980=100.00)	
	1980	1981	1982			
OPERATING COSTS						
<u>Personnel</u>						
<u>Military personnel</u>						
1. Colonels	33 927	36 820	40 682	926	108.53	119.91
2. Majors	25 341	27 502	30 388	2 423	108.53	119.92
3. Captains	21 625	23 470	25 931	3 784	108.53	119.91
4. Lieutenants	18 422	19 993	22 088	2 848	108.53	119.90
5. Staff sergeants	12 349	13 473	15 095	5 176	109.12	122.24
6. Sergeants	10 824	11 809	13 230	7 114	109.10	122.23
7. Corporals	10 098	10 923	11 969	7 878	108.17	118.53
8. Privates	9 698	10 433	11 260	11 966	107.58	116.11
9. Privates (8 years)	10 486	11 283	12 179	370	107.60	116.15
<u>Civilian personnel</u>						
10. Typists	12 709	14 004	14 729	2 067	110.19	115.89
11. Administrative civil servants	20 872	22 998	24 187	2 067	110.19	115.88
12. Car mechanics	21 549	23 744	24 971	2 067	110.19	115.88
13. Aircraft mechanics	22 670	24 979	26 271	2 067	110.19	115.88
14. Computer engineers	24 439	26 928	28 321	2 067	110.18	115.88
15. Warehouse workers	13 331	14 688	15 447	2 067	110.18	115.87
16. Kitchen workers	14 218	15 666	16 476	2 067	110.18	115.88
17. Medical doctors	58 615	63 227	67 493	2 067	107.87	115.15
18. Medical nurses	22 556	24 534	26 382	2 067	108.77	116.96
19. Scientists (doctors)	37 155	40 938	43 054	2 067	110.18	115.88
<u>Operations and maintenance</u>						
<u>Materials for current use</u>						
20. Helmet and liner	24.81	25.10	24.68	256	101.17	99.48
21. Shirt	8.52	12.10	16.08	256	142.02	188.73
22. Undershirt	1.03	1.19	1.35	256	115.53	131.07
23. Trousers	8.96	13.10	17.20	256	146.21	191.96
24. Undershirt	1.06	1.16	1.10	256	109.43	103.77
25. Socks	1.35	1.18	1.42	256	87.41	105.19

/...

United States input file (continued)

Cost category/item	Prices or indices			Weights 1982	Indices (1980=100.00)	
	1980	1981	1982			
26. Combat boots	18.80	30.10	37.30	256	160.11	198.40
27. Belt	0.77	0.62	0.85	256	80.52	110.39
28. Buckle	0.78	0.78	0.86	256	100.00	110.26
29. Field jacket and liner	38.30	42.80	43.00	2 302	111.75	112.27
30. Regular petrol	0.97	1.10	0.96	2 302	113.40	98.97
31. Diesel fuel	0.97	1.00	0.99	2 302	103.09	102.06
32. JP-4 jet fuel	0.91	1.43	0.97	2 302	157.14	106.59
33. Kerosene	0.77	0.74	0.79	2 302	96.10	102.60
34. Electricity	40.23	47.99	55.34	2 302	119.29	137.56
35. Natural gas	3.17	3.64	4.22	2 302	114.83	133.12
<u>Maintenance and repair</u>						
36. Car mechanics	21 549	23 744	24 971	2 302	110.19	115.88
37. Aircraft mechanics	22 670	24 979	26 271	2 302	110.19	115.88
<u>Purchased services</u>						
38. Postage	0.15	0.19	0.20	2 302	130.00	133.33
39. Local phonecall	0.15	0.16	0.18	2 302	106.67	120.00
40. Railway travel	0.13	0.14	0.15	2 302	107.03	114.84
41. Air travel	0.17	0.15	0.15	2 302	85.14	85.14
42. Per diem	60.00	75.00	75.00	2 302	125.00	125.00
<u>Rent costs</u>						
43. Rents	7.03	7.57	8.03	2 302	107.68	114.22
Total weight				100 000		
Total expenditures				122 055		

United States input file (continued)

Cost category/item	Prices or indices			Weights 1982	Indices (1980=100.00)		
	1980	1981	1982				
PROCUREMENT AND CONSTRUCTION							
<u>Procurement</u>							
Aircraft							
1.	2.1.1.1	7 967	8 738	10 753	5 501	109.68	134.97
2.	2.1.1.2	6 621	6 993	7 736	5 501	105.62	116.84
3.	2.1.1.1	1 065	1 375	1 617	5 501	129.11	151.83
4.	2.1.1.3	4 973	5 574	7 521	5 501	112.09	151.24
5.	2.1.1.6	2 720	3 162	3 692	5 501	116.25	135.74
6.	2.1.1.7	1 748	2 086	2 918	5 501	119.34	166.93
7.	2.1.1.8	1 879	2 246	2 607	5 501	119.53	138.74
8.	2.1.1.8	1 728	1 810	1 923	5 501	104.75	111.28
Missiles							
9.	2.1.2.2	253.00	346.00	404.00	4 136	136.76	159.68
10.	2.1.2.4	20.80	17.30	16.70	4 136	83.17	80.29
Ships							
11.	2.1.4.5	253.00	282.00	306.00	6 228	111.46	120.95
12.	2.1.4.10	561.00	587.00	623.00	6 228	104.63	111.05
Armoured vehicles							
13.	2.1.5.1	1 121	1 268	1 417	1 275	113.11	126.40
14.	2.1.5.2	57.00	76.00	88.00	1 275	133.33	154.39
15.	2.1.5.4	74.00	71.00	81.00	1 275	95.95	109.46
Other ordnance etc.							
16.	2.1.7.2	3.70	4.10	4.80	2 907	110.81	129.73
<u>Construction</u>							
17.	2.2.1.1	70.52	70.52	40.03	629	100.00	56.76
18.	2.2.5.1	39.66	47.81	48.99	629	120.55	123.52
19.	2.2.6.1	97.00	117.00	118.00	629	120.62	121.65
20.	2.2.8.1	40.56	28.72	33.47	629	70.81	82.52
21.	2.2.8.1	69.00	70.00	74.00	629	101.45	107.25
22.	2.2.8.2	55.98	64.03	65.41	629	114.38	116.85
23.	2.2.8.2	58.00	73.00	81.00	629	125.86	139.66

United States input file (continued)

Cost category/item	Prices or indices			Weights 1982	Indices (1980=100.00)	
	1980	1981	1982			
<u>Research and development</u>						
24. Scientists	37 155	40 938	43 054	3 137	110.18	115.88
25. Computer engineers	24 439	26 928	28 321	3 137	110.18	115.88
26. Adm. civil servants	20 872	22 998	24 187	3 137	110.19	115.88
27. Current expenditure	100.00	109.52	112.39	14 479	109.52	112.39
28. Rent costs	100.00	107.68	114.22	241	107.68	114.22
Total weight				100 000		
Total expenditures				64 260		

Results

		<u>1980</u>	<u>1981</u>	<u>1982</u>
1-43+				
1-28	Total military expenditures	100	110.94	120.45
1-43	Operating costs	100	110.50	117.42
1-19	Personnel	100	108.83	118.14
1-9	Military personnel	100	108.35	119.22
10-19	Civilian personnel	100	109.81	115.92
20-43	Operations and maintenance	100	113.36	116.18
20-35	Materials for current use	100	116.43	116.36
36-37	Maintenance and repair	100	110.19	115.88
38-42	Purchased services	100	110.85	116.39
43	Rent costs	100	107.68	114.22
1-16	Procurement	100	112.71	131.60
17-23	Construction	100	107.67	106.89
24-28	Research and development	100	109.76	113.77

Military expenditures of participating States in 1982

(Millions of each State's national currency)

	Australia dollars	Austria schillings	Finland Markkaa	Italy lire	Norway kroner	Sweden kronor	United Kingdom pounds	United States dollars
1. Military personnel	1 809	7 200	1 400	4 726 000	3 828	5 843	3 588	51 867
2. Civilian personnel	411	1 890	435	756 000	1 375	1 914	1 843	25 225
3. Other operating costs	1 165	1 951	953	1 946 000	2 786	3 837	4 921	44 954
4. Procurement	564	2 275	1 271	2 083 000	2 175	5 235	2 960	46 850
5. Construction	182	886	155		740	902		2 827
6. Research and development	128	0	8	99 000	91	1 423	1 637	15 507
Total	4 259	14 402	4 222	9 610 000	10 995	19 154	14 949	187 230