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**NATIONAL ACCOUNTS AND BALANCES: LINKS BETWEEN THE  
SYSTEM OF NATIONAL ACCOUNTS (SNA) AND THE SYSTEM OF  
BALANCES OF THE NATIONAL ECONOMY (MPS)**

Progress report on SNA/MPS links

Report of the Secretary-General

**SUMMARY**

The present document contains a general description of the work on SNA/MPS links carried out since the twenty-second session of the Statistical Commission (paras. 1-13). Section I of the report introduces the results of the illustrative calculations of gross domestic product (GDP) and net material product (NMP) of selected centrally-planned and market economies which were carried out within the framework of the second round of those exercises, both by the Statistical Office of the United Nations Secretariat and by countries on a bilateral basis (paras. 14-27). A good deal of attention has been given to the current work on improving the conceptual framework for the System of National Accounts (SNA) and the System of Balances of the National Economy (MPS) comparisons (paras. 28-63). The present document also includes some proposals for future work (paras. 64-72) and points for discussion (para. 72).

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## INTRODUCTION

1. The purpose of the present document is to report on the major accomplishments in the study of links between the System of National Accounts (SNA) and the System of Balances of the National Economy (MPS) since the twenty-second session of the Commission, and to present the results of the experimental illustrative calculations of the gross domestic product (GDP) for selected countries which use MPS and of the net material product (NMP) for selected countries which use SNA. Those calculations were carried out by the Statistical Office of the United Nations Secretariat in the course of the second round of calculations. <sup>1/</sup> This document also presents a review of the general situation regarding the work on improving and elaborating the conceptual framework for SNA/MPS comparisons and a discussion of selected conceptual issues of intersystem conversions, and it outlines proposals for future work in the area of SNA and MPS comparisons.
2. At its twenty-second session, the Statistical Commission noted that the study of SNA/MPS links represented an important component of the overall activity of the Statistical Office in the field of international comparisons of national product and similar related aggregates. The Commission also emphasized the desirability of continuing that study and classified the project as one to which a high priority should be accorded. The Commission broadly endorsed the basic directions for future work in that area which were outlined in the progress report presented to the Commission at its twenty-second session (E/CN.3/1983/8). More specifically, the Commission urged that the revision of the document entitled Comparisons of the System of National Accounts and the System of Balances of the National Economy, Part One, <sup>2/</sup> be expedited. That document contains the basic principles for linking the relevant aggregates of the two systems of national accounting.
3. The Commission also emphasized the importance of the experimental illustrative calculations of GDP and NMP for centrally-planned economies and for market economies, respectively, with the objectives of: (a) testing the conceptual framework and standard conversion tables, (b) accumulating experience in collecting and processing primary data needed for those calculations, (c) accumulating input for further conceptual work in that area and (d) analysing ratios between corresponding categories of SNA and MPS in terms of actual figures.
4. The Commission specifically recommended that the work on the revision of the methodological document on SNA and MPS comparisons should reflect the experience gained through illustrative calculations.
5. The other directions of work on that topic suggested by the Commission included the continuation of the study on total consumption of the population, the revision of the glossary of SNA/MPS terminology, the continuation of the work on the conversion key between International Standard Industrial Classification (ISIC) and the corresponding Council for Mutual Economic Assistance Industrial Classification by kind of economic activity.
6. In practice, the work on the study of SNA/MPS links was carried out, to a large extent, along the lines suggested by the Commission. Thus, efforts have been undertaken to speed up and to expand illustrative calculations of GDP and NMP. A

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more detailed account of that work will be given in section I below (see paras. 14-27). Those calculations were carried out by the Statistical Office of the United Nations Secretariat in close co-operation with national statistical offices which kindly provided additional data to supplement the input-output tables, the major source of data. Those offices also commented on the drafts of the calculations and explanatory notes. The Statistical Office of the United Nations Secretariat is grateful, in particular, for the co-operation in that area to the Statistical Offices of Canada, Finland, Japan, the United Kingdom of Great Britain and Northern Ireland and to the Bureau of Economic Analysis of the United States Department of Commerce. The assistance provided by Statistics Canada also merits special mention. As a result of that assistance, it has proved to be feasible to introduce a number of improvements into the draft of the material containing the calculation of NMP of Canada originally prepared by the Statistical Office of the United Nations Secretariat. Those improvements made possible a very careful separation of the material activities from the non-material ones. Two offices have agreed to continue that co-operation in the future. Statistics Canada has agreed to provide information in the form of condensed input-output tables adapted for the intersystem comparisons for the period 1971 to 1980 inclusive. The calculation of NMP on the basis of that information will facilitate the analysis of the relationship between the corresponding categories of SNA and MPS for a relatively long period.

7. The work on a bilateral basis by countries, the advantages of which were emphasized by the Commission, also continued. France and Hungary continued their successful co-operation in that area and completed new bilateral comparison of GDP and NMP for 1981. Those two countries plan to publish a common publication in which the important issues relevant for linking the main categories of the two systems and problems of the conversion will be discussed, and the results are presented as a separate background document which is also submitted to the Commission for information. Also, France and Hungary prepared a paper for the Statistical Commission which deals with the most important problems of the conversion and some modifications and simplifications for the conversion. The paper is entitled "The Franco-Hungarian experiment in applying document F.20 recommendations". Finland and Bulgaria have agreed, in principle, to start bilateral comparisons of basic output indicators by branches of economy. It is hoped that other countries will carry out similar joint studies in the near future.

8. The Statistical Office of the United Nations Secretariat, in co-operation with the Statistical Division of the Economic Commission for Europe (ECE), continued its work on improving and elaborating the conceptual framework for SNA and MPS comparisons. In that work, the Statistical Office was guided by the Commission's recommendations at its twenty-first and twenty-second sessions. The Commission suggested, among other things, the employment of two types of standard conversion tables which would supplement each other but would be used for somewhat different purposes. One set of conversion tables (common to both SNA and MPS and constructed in terms of relatively broad categories) will be used for actual calculations; the other set will serve more theoretical purposes and will be more detailed. Conversion tables of the latter type will be constructed separately for SNA and MPS in terms of the categories and terminology elaborated in those systems. They will rely on SNA and MPS matrices. It is believed that such an approach will facilitate the identification of specific adjustments needed for the conversions, as well as achieving better consistency between interrelated conversion tables. In its recent

work in that area, the Statistical Office focused on improving conversion tables of the second type, which are presented in the progress reports on that topic for the twenty-first and twenty-second session of the Commission (E/CN.3/543 and E/CN.3/1983/8). Efforts were undertaken by the Statistical Office to revise the conversion tables in the light of the discussions held at the last two sessions of the Commission.

9. The Statistical Office of the United Nations Secretariat, in close co-operation with the Statistical Division of ECE, started preparatory work on the revision of the document on SNA and MPS comparisons. The outline of that revised document has been agreed upon and work on drafting has begun. As a part of the preparatory work on the revision, the Statistical Office has continued its efforts on clarifying some conceptual issues of intersystem comparisons, including the treatment of foreign trade within the context of SNA and MPS comparisons, the treatment of capital formation flows, the treatment of household productive activities, and the treatment of the value added tax. Brief discussions on some of those issues are in section II below (see paras. 28-64).

10. The Statistical Office has continued studying the possibilities of introducing some versions of the conversion tables in the SNA and MPS questionnaires currently in use. To achieve that objective, it will send a pre-filled form dealing with the derivation of NMP to some countries with market economies. The figures included on the form were obtained in the course of experimental illustrative calculations carried out by the Statistical Office on the basis of input-output tables. Countries will be invited to comment on those figures and will be urged to continue making their own estimates. It is hoped that that step will help countries to understand better the technical procedures used for intersystem comparisons. It is also hoped that, in the long run, that will make it possible to start collecting and publishing data on NMP and GDP for market economies and centrally-planned economies, respectively, on an annual basis.

11. There have been some other activities related to that topic as well. For example, work has continued on the conversion key between the United Nations Industrial Classification of All Economic Activities (ISIC) and the Council for Mutual Economic Assistance (CMEA) Industrial Classification which was initiated several years ago by the CMEA secretariat. Some progress has been achieved since the twenty-second session of the Commission. Testing of the first draft conversion key was completed by Bulgaria and Finland. That made it possible to introduce a number of significant improvements. A revised draft was commented on by some countries and international organizations. The final version of the conversion key was discussed at the thirty-second session of the Conference of European Statisticians in June 1984, and it was agreed that, as soon as a final version of the conversion key was worked out, the Secretariat would publish it under the title "Conversion key between the International Standard Industrial Classification of all Economic Activities (ISIC) and the Classification of the Branches of the National Economy (CBNE)" in the series entitled Statistical Standards and Studies.

12. It was felt at the Statistical Office of the United Nations Secretariat that the work on the revision of the glossary of SNA/MPS terminology should be postponed in order to accommodate the changes which are expected to be introduced as a result of the revision of both systems which is currently under way. Also, the work on

total consumption of the population, as well as on the adaptation of the System of Indicators of Non-Material Services (SINS) for intersystem comparisons, was postponed owing to a lack of resources.

13. Finally, the present paper outlines some proposals concerning future work in the area of SNA and MPS comparisons. The proposals envisage, among other things, drafting a revised document on SNA and MPS comparisons and discussing it at the meeting of experts on national accounts and balances and a further expansion of work on illustrative calculations of GDP and NMP. Those proposals are set out in more detail in section III below (see paras. 65-72).

#### I. EXPERIMENTAL ILLUSTRATIVE CALCULATIONS OF GDP AND NMP

14. The Statistical Office of the United Nations Secretariat has continued experimental illustrative calculations of GDP and NMP for selected centrally-planned economies, and market economies, respectively. The second round of those calculations was initiated with the objective of covering approximately 30 to 40 countries. That will make it possible to update the estimates obtained as a result of the first round and to introduce some new countries. It is hoped that those data will provide a more comprehensive and systematic picture of quantitative differences between the corresponding categories of SNA and MPS. The calculations are also an important part of the current work on the improvement of the conceptual framework for SNA and MPS comparisons.

15. As of 1 February 1984, the calculations of the second round were either under way or completed for the following countries:

##### (a) Market economies

- (i) Canada (1976), Finland (1970),\* Germany, Federal Republic of (1974), Netherlands (1978), United Kingdom (1971),\* United States (1972);\*
- (ii) Chile (1972), Ecuador (1978), Israel (1975 and 1976), Kenya (1971 and 1976),\* Mexico (1975), Thailand (1975), Zambia (1973).

##### (b) Centrally-planned economies

Hungary (1981),\* Yugoslavia (1972).\*

16. As in the past, the Statistical Office has carried out those calculations on the basis of information contained in the input-output tables, which, after certain modifications and rearrangements, provide the basic data needed for the conversion of GDP and NMP. In most cases, additional data supplementing input-output tables were sought and obtained from countries. Those data mainly concerned selected non-material activities included in the input-output tables, together with material activities, as well as data for such categories as business travel expenditure and expenditures on social and cultural services provided to employees.

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\* Updates of previous estimates.

17. The derivation of NMP and GDP has been carried out on the basis of the conversion tables suggested in the comparisons of the System of National Accounts and the System of Balances of the National Economy. In some cases, certain deviations from schemes of those standard conversion tables were made to accommodate national peculiarities in the implementation of national accounts. For example, in the case of the derivation of NMP of the United States, it was necessary to introduce additional adjustments with regard to such items as factor income from abroad and inventory valuation.

18. In all cases, three types of conversion tables were employed, depending on the nature of the data included in the respective input-output table: (a) value added by industries, (b) final disposition and (c) gross output and intermediate consumption. The application of all three conversion tables is essential for double-checking the estimates of GDP/NMP obtained through the calculations. In principle, the application of different conversion tables makes it possible to obtain comparable figures not only at the level of GDP/NMP, but also at the level of their components.

19. Table 1 summarizes the results of the calculations which were commented on and approved by the countries concerned, as of 1 February 1984. Those data are presented in the form of ratios referring to relationships between corresponding categories of SNA and MPS. The results of the calculations of the second round are shown in the table, together with previous calculations, which are indicated by an a footnote.

20. The basic conclusions which may be drawn from table 1 can be summarized as follows:

(a) There are significant differences between the countries with regard to the ratios of net domestic product (NDP) to net material product (NMP). Therefore, it is not recommended to apply the ratios computed for country A to the calculations for country B, especially if those countries are different in terms of the structure of the economies and the level of economic development;

(b) The ratio of net domestic product to net material product is generally higher in countries with higher levels of economic development, measured in terms of per capita GDP. It should be noted, however, that those calculations have been made in national currencies in current prices. The results of calculations in constant prices or in average international prices might have been different, as was demonstrated in "The share of services in economic growth" by I. Kravis, A. Heston and R. Summers. <sup>3/</sup> Those calculations should not necessarily be different as far as the general trend is concerned. It should be noted that Mr. I. Kravis and his associates analyse the structure of final demand, whereas the ratio of NDP to NMP reflects differences in the structure of national product by kind of economic activity;

(c) Year-to-year fluctuations in the ratio of NDP to NMP are relatively small, but fluctuations for five-year periods are significant enough to be disregarded;

Table 1. Relationship between relevant aggregates of SNA and MPS for selected countries

(MPS aggregates = 100,0)

Aggregates	Relationship between the aggregates			
Countries and years	GDP and NMP	Net domestic product and net material product	Final consumption expenditures according to SNA and MPS, respectively	Gross capital formation (SNA) and net capital formation (MPS)
	(1)	(2)	(3)	(4)
<u>United States</u>				
1963 <u>a/</u>	147.0	133.9	135.7	264.3
1967 <u>a/</u>	147.3	134.9	137.4	227.2
1972	152.5	139.0	145.3	209.8
<u>United Kingdom</u>				
1963 <u>a/</u>	136.1	125.7	130.1	196.1
1971 <u>a/</u>	143.0	130.1	138.6	222.2
1972 <u>a/</u>	144.4	131.1	138.2	229.4
1974	147.5	132.1	136.5	191.7
<u>Japan</u>				
1965 <u>a/</u>	129.5	112.9	121.3	166.0
1970 <u>a/</u>	126.1	109.7	120.5	150.1
1975	139.0	120.1	127.0	168.0
<u>Canada</u>				
1976 <u>b/</u>	151.2	136.1	148.1	188.9

a/ Previous calculations (from first round).b/ Preliminary figures.

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(d) On the whole, the ratio of net domestic product to net material product tends to increase over the period. That is particularly true in relation with the United States and the United Kingdom. In the case of Japan, the same trend is observed. Figures for 1975, however, are estimated from newly supplied information from Japan and are not entirely comparable to estimates for previous years;

(e) The accuracy of intersystem comparisons is, on the whole, higher at the level of GDP or NMP than at the level of its major categories of final demand. In some cases, data were not available for adjustments dealing with the structure of GDP/NMP. No adjustments were introduced, for example, with regard to the different treatment of "direct imports and exports" or with regard to expenditures for military purposes. Those adjustments, however, cancel each other out at the level of GDP or NMP;

(f) No attempt has been made to introduce any adjustments dealing with "institutional differences". One of those differences relates to the financial assistance provided by Governments to various economic units belonging to different sectors of the economy. Depending on the type of transactor involved, government assistance can be counted as subsidies and, hence, excluded from GDP, or it can be counted as an intergovernmental transfer.

21. The paragraphs below contain a more detailed description of some of the procedures which were used for the calculations for selected countries shown in table 1.

22. As a rule, the conversion of GDP into NMP and vice versa was carried out in two stages. In the first stage, computations were based exclusively on the basis of data contained in input-output tables and derivations of GDP or NMP were carried out with the help of standard conversion tables. At the second stage, the estimates of GDP and NMP arrived at in the conversion tables were amended outside the conversion tables in order to take into account supplementary data supplied by countries or collected from other sources. This This relates, for example, to adjustments made with regard to such items as expenses of employees on business trips, expenditures of enterprises on social and cultural services to employees and so forth. Such an approach ensures, in principle, consistency between the data contained in the input-output tables and the estimates obtained in the conversion tables, as well as between the interrelated items in the conversion tables. This consistency is believed to be essential for demonstrating the technique of intersystem comparisons and the methods used to process primary data. All adjustments shown in the conversion tables can be easily identified in the input-output tables.

23. National input-output tables, as a major source of data for intersystems conversions, had to be adapted for the calculations in question. The major adaptation consisted in condensing the tables and regrouping the industries shown in the table with the objective of making a distinction between material and non-material activities as explicitly as possible. In most of the cases, reclassifications concerned activities such as repairs of shoes and cars, data processing, movie production, restaurants and other catering services, laundries and dyeing services. Those activities, regarded in MPS as material, are in many cases allocated in the input-output tables among industries of the non-material

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sphere. The reclassifications and condensations were, by and large, made on the basis of the latest version of CMEA industrial classification by kind of economic activity. In many cases, statistical offices of the involved countries furnished data on the value added by those activities. The Statistical Office of the United Nations Secretariat, however, had to adopt certain conventions to estimate the commodity structure of intermediate input, for example.

24. In some cases, additional efforts were made to adapt the peculiarities of the national input-output tables in order to make the appropriate calculations. For example, in the original input-output table of the United Kingdom, indirect taxes (less subsidies) were allocated among both intermediate and final users and shown in a separate row of table 1. It means that the value added, which was recorded in the third quadrant of the input-output table, does not include net indirect taxes levied on final products. Therefore, efforts were made to reallocate indirect taxes levied on the final products to the industries which produced the relevant commodities. This reallocation was made with the help of data on indirect taxes classified by industry of origin furnished by the Central Statistical Office of the United Kingdom. The reallocation of indirect taxes led to some other changes in the original condensed input-output table. In fact, some conventions were adopted to allocate the relevant amounts of indirect taxes to the specific commodity groups, distinguished in the second quadrant of the input-output tables. Those estimations and reallocations did not affect the general totals shown in the original tables. They made it possible, however, to subdivide all of the components of final demand and value added into material and non-material parts. Somewhat similar procedures were used for rearranging the input-output table of Canada.

25. In many cases, efforts were made to separate the data on consumption of fixed assets from the operating surplus shown in the original input-output tables on a gross basis. In certain cases, those data, classified by industries (distinguished in the input-output tables), were furnished by countries. In other cases, estimates were made by the Statistical Office of the United Nations Secretariat. As a rule, data on stocks of fixed assets classified by industries were used for obtaining the estimates.

26. Some comments are in order with regard to the treatment of secondary products. Problems may arise when material industries which are shown in the input-output tables produce non-material services as secondary products and vice versa, namely, when industries in the non-material sphere produce material goods as secondary products. Special efforts to solve that problem may be required when data on input (both primary and intermediate) refer to the production of material goods and secondary non-material services or the other way around. In principle, it is desirable to split input on material goods from input on non-material services so that a higher accuracy of calculations is attained. In the course of intersystem derivations presented in the present paper, some adjustments relating to the secondary products were made in the case of the United States. It should be mentioned, however, that the method of treatment of secondary products in the original United States input-output table for 1972 differs from that employed in previous studies.

27. In some cases, it had proven to be difficult to obtain data on the commodity

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structure of imports so that a distinction between material goods and non-material services could be made with regard to net exports and related items. Therefore, certain conventions had to be adopted for those calculations. For example, in the case of the United Kingdom, it was assumed that imports of non-material services were zero. That made it possible to arrive at net exports of non-material services - the item which appears in the conversion table dealing with the derivation of net material product on the basis of final demand data.

## II. WORK ON THE ELABORATION OF THE CONCEPTUAL FRAMEWORK OF SNA AND MPS COMPARISONS

### A. Some introductory remarks

28. The Statistical Office of the United Nations Secretariat, in accordance with the recommendations of the Commission, has continued its efforts in improving the conceptual framework for SNA/MPS comparisons. There are several directions in which the conceptual framework <sup>4/</sup> could be improved and elaborated. First, the revised document on SNA and MPS comparisons should include a number of new topics which have not been covered in the original document on that subject, namely the impact of institutional differences on comparisons of GDP and NMP, problems of comparison of total consumption of the population and collecting and processing primary data needed for intersystem conversions. Second, the revised document should provide a more comprehensive description of the differences between the two systems of national accounting, as well as discussions of the selected conceptual problems. Third, the revised document should include improved conversion tables needed to derive GDP for centrally-planned economies and NMP for market economies. The improvements may consist of (a) the rectification of certain inaccuracies found in the existing document, (b) the introduction of some additional adjustments needed for comparisons, (c) some changes to ensure better consistency between interrelated conversion tables and interrelated categories in different conversion tables. That implies the establishment of links between standard conversion tables and modified conceptual matrices of both systems of national accounting.

29. On the whole, the revised conceptual framework is expected to present a more detailed and precise picture of the differences between SNA and MPS as well as of the procedures needed to link the categories which are suitable for international comparisons.

30. The Statistical Office has undertaken a number of specific steps towards the proposed revision of the document on SNA and MPS comparisons. First, the Statistical Office, in close co-operation with the ECE Statistical Division, has worked out a tentative outline of the revised document. Second, the Statistical Office has started work on drafting specific materials which will eventually be incorporated in it. For example, the Statistical Office has revised the drafts of the conversion tables designed for derivation of GDP for countries with centrally-planned economies which were presented in the progress report on that topic to the Commission at its twenty-first session. The revision was undertaken to reflect comments made during discussions on that subject at the twenty-first and twenty-second sessions of the Commission. Third, the Office has continued work on clarifying certain conceptual problems of SNA and MPS comparisons. The discussion

of those problems is important for defining specific adjustments needed for comparisons, as well as for better understanding the limitations of the comparisons and for a better interpretation of the results of the comparisons. Some of those problems are discussed below.

B. Treatment of external trade flows in the  
context of intersystem comparisons

31. The treatment of external trade flows, such as exports, imports, and gross output of external trade, seems to require some attention as a controversial issue. It should be recalled that, in the late 1960s, the differences in the methods of the recording of those flows in the SNA and the MPS were discussed at some length in the papers presented for the consideration of an expert group meetings on national accounts and balances. Those meetings were convened under the auspices of the Conference of European Statisticians, but no specific conclusions were reached regarding the adjustments needed for international comparisons.

32. During the 1970s, virtually no attention was paid to the treatment of external trade flows. In the early 1980s, however, interest in that topic was revived in the papers presented to the workshops organized by the World Bank on national income statistics in countries with centrally planned economies. In some papers discussed at the workshops, it was argued that peculiarities in the treatment of external trade in the national accounts of the USSR and in some other countries with centrally planned economies resulted in a significant incomparability of national income data when compared with countries using SNA. Thus, in the background paper entitled "Alternative approaches to estimating national income statistics of centrally planned economies," prepared by Paul Marer, the special treatment of foreign trade adopted in the USSR national accounts (balances) was considered to be a source of substantial incomparability between the Soviet national income and the national income of the United States and other countries with market economies. Furthermore, the derivation of the Soviet Union's GDP for 1970, presented in that paper, showed that an adjustment introduced to the Soviet official national income data, owing to the special treatment of foreign trade, accounted for approximately 10 per cent of the difference between Soviet official data on NMP and estimates of the GDP of the USSR. In the light of the above, it would seem to be expedient to examine the problem again, to review the methodology and to discuss alternative approaches which are available for improving international comparability of data.

33. It should be recalled that the official description of MPS contained in the publication entitled Basic Principles of the System of Balances of the National Economy 5/ envisages the application of two methods of recording external trade flows in the balance of production, consumption and accumulation of global product (material balance). 6/ The first method is similar to the one recommended in SNA and can be described briefly as follows. On the disposition side of the material balance, net exports, as an item of disposition of net material product, are defined as the excess of exports over imports of material goods converted into domestic currency with the help of official exchange rates. On the production side of the material balance, a contribution of external trade to global product is computed on the basis of the following formula:

$$T = (Ia - Ib) + (Eb - Ea) \quad (1)$$

where T = gross output of external trade; Ib and Eb = imports and exports converted into domestic currencies with the help of exchange rates; Ea and Ia = value of domestic acquisition of exports and value of domestic sales of imports.

34. The second method which is suggested as an alternative to the first, a basic one and, in fact, used by some countries with centrally-planned economies, may be briefly described as follows.

35. On the disposition side of the material balance, net exports are computed with the help of the following formula:

$$Bt^1_L = (Eb - Ib)L \quad (2)$$

where  $Bt^1 = (Eb - Ib)$ ; Eb and Ib as above,  $L = \frac{Ia}{Ib}$  if  $Bt^1 < 0$ , and  $L = \frac{Ea}{Eb}$  if

$Bt^1 > 0$ . Thus, L is a special coefficient, which is sometimes called the "internal exchange rate" and which shows the ratio of foreign prices to domestic prices.

36. On the production side of the material balance, the contribution of external trade to the global product is computed as follows:

$$T^1 = Bt^1_L - Bt \quad (3)$$

where  $T^1$  = gross output of external trade;  $Bt = (Ea - Ia)$ ;  $Bt^1_L = (Eb - Ib)L$ .

37. When, however, net material product is computed, the contribution to it by external trade is determined on a net basis.

In other words:

$$K = Bt^1_L - Bt - M - D, \quad (4)$$

where K is the contribution of external trade on a net basis;  $Bt^1_L$  and Bt are as above; M = intermediate input by external trade sector; D = the consumption of fixed assets.

38. It should be noted that the adoption of expression (2) for the calculation of net exports on the disposition side of the material balance automatically leads to a modification in the formula in calculating the net contribution of external trade to NMP on the production side of the balance, shown in equation (4).

39. There can be, of course, different interpretations of the rationale behind the formulae of the second method. One of them is that NMP includes "special earnings by foreign trade" which may be regarded as a sort of rent or "profit on price discrepancies". That interpretation implies that the closest counterpart to "special earnings" in SNA is import duties which are not normally allocated to any particular industry but are included in GDP as a separate item. That

interpretation may also imply that "special earnings" reflect a measure of incomparability between GDP and NMP. That conclusion would be erroneous. In fact, the standard definition of GDP includes, in addition to import duties, a component which measures a contribution to domestic product by external trade. That component is computed in SNA as follows:

$$K^1 = Bt^1 - Bt - M - D \quad (5)$$

where  $K^1$  = the contribution of external trade to net domestic product, on a net basis (all other components as above).

40. If, for the sake of simplicity, one assumes that the scope of M and D is the same in SNA and MPS, then the measure of incomparability between Net Domestic Product (NDP) and NMP due to differences in the treatment of external trade can be denoted as follows:

$$S = Bt^1 - Bt - M - D - Bt^1L + Bt + M + D = Bt^1 (1-L) \quad (6)$$

41. If we now turn to the disposition side of national product data, we can see that the difference between NDP and NMP is the same as in equation (6). In other words, if we deduct net exports as defined in SNA from net exports as defined in MPS, we will obtain  $Bt^1 (1-L)$ .

42. The conclusion is that the category of the contribution of external trade to national product is similar in MPS and in SNA, but there are certain differences with regard to methods used for the calculations.

43. Let us now turn to a simplified numerical example in order to demonstrate the differences between the methods adopted in SNA and in MPS for the treatment of external trade. Let us assume that:

- (a) Domestic acquisition of exports = 20;
- (b) Exports  $\frac{7}{/}$  = 30;
- (c) Imports  $\frac{7}{/}$  = 40;
- (d) Domestic sales of imports = 60.

Thus, the contribution to NMP by external trade will be computed in accordance with the MPS second method as follows:

$$K = (60 - 20) - (40 - 30) \frac{60}{40} = 25$$

For the sake of simplicity, assume M and D are equal to zero. On the other hand, net exports will be equal to minus 15.  $Bt^1L = (30 - 40) 1.5 = -15$ . If we now use SNA definitions, one will obtain the following results: the contribution of external trade to domestic product will be equal to 30.

$$K^1 = (60 - 20) - (40 - 30) = 30$$

Net exports in SNA sense will be equal to -10,  $Bt^1 = (30 - 40) = -10$ . It is

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perhaps worth noting that, if  $Bt^1 = 0$ , the calculations in terms of SNA and MPS formulae will be identical. If, for example, we assumed  $Ib = 30$  instead of 40, then the contribution of external trade to national product in both cases will be equal to 40.

44. Some experts believe that the expression  $Bt^1 (1 - L)$  reflects a bias in national income data of centrally-planned economies which employ the second method of treatment for external trade. A more plausible interpretation would be that the expression  $Bt^1 (1 - L)$  measures a bias in NMP data, only if one takes into consideration the differences in accounting procedures adopted in both systems but disregards important peculiarities in price systems and in the systems of exchange rates. In fact, the purpose of the second method was to accommodate those peculiarities and to ensure that the data was more comparable with those obtained in terms of the first method. 8/ The expression  $Bt^1 (1 - L)$  could be taken as a measure of bias if, except for the differences in accounting procedures, all other conditions, including the principles underlying price systems and exchange rates, were the same, or at least similar.

45. Another argument which is sometimes used against introducing any of the adjustments in question has to do with import duties. The countries with centrally-planned economies which employ the second method either do not have import duties or they are negligible. Therefore, it can be argued, as some experts do, that "special earnings by external trade" in MPS should be considered as a counterpart of import duties in SNA.

46. Some experts argue that peculiarities in the treatment of foreign trade in MPS have an impact on the valuation of the respective external trade flows and that those differences can be handled with the help of appropriate purchasing power parities.

47. There are, of course, some other problems relating to the comparisons of external trade flows in the context of SNA/MPS conversions. For example, there are differences in the coverage of exports and imports caused by the differences in definitions of economic production adopted in SNA and MPS. There are also differences in the treatment of the categories of "direct" imports and exports as well as differences in the treatment of monetary gold. None of those issues will be discussed in the present paper. They should be discussed, however, in the revised document on SNA and MPS comparisons and the appropriate adjustment required in some cases should be introduced in the standard conversion tables.

48. To summarize what has been discussed above, the following conclusions may be drawn:

(a) There are some differences in the procedures adopted in SNA and in MPS for handling external trade, but, to a considerable extent, they reflect the differences in the organization of the economy rather than the differences in the definitions, concepts and classifications employed in the two systems of national accounting for the calculation of national product;

(b) It would be erroneous to assume that the MPS category which is sometimes called "special earnings by external trade" does not have a counterpart in SNA.

Clearly, that category, under a different name and with some modifications, exists in both systems, and it measures an output of external trade; it appears that the intersystem differences in the computation of output of external trade relate to the valuation of the flows involved rather than to the scope of the aggregates; those differences in valuation reflect differences in the principles underlying prices and exchange rates in centrally-planned economies versus market economies;

(c) It would also be erroneous to assume that "special earnings by external trade" represents a measure of a bias of NMP versus GDP due to the differences mentioned above in the accounting of external trade. From a purely technical point of view, that bias could be measured with the help of the following equation:  $Bt^1 (1-L)$ , which is the difference between "special earnings by external trade" as defined in MPS and its SNA counterpart;

(d) The question, however, arises whether the introduction of some adjustments to NMP or GDP, due to the different treatment of external trade in each, is needed in order to improve the international comparability of data. In fact, the special formula for the calculation of gross output of external trade in MPS (the second method) is designed to take account of the peculiarities in prices and exchange rates;

(e) There are some cases, however, where certain adjustments relating to external trade flows are clearly necessary to ensure an accurate derivation of GDP or NMP. They are largely associated with differences in definitions of economic production, adopted in both systems, as well as with differences in accounting "direct" exports and imports.

### C. Treatment of capital formation flows in the SNA and MPS

49. During recent years, the Statistical Office of the United Nations Secretariat continued its efforts in a more detailed study of intersystem differences regarding the individual categories in MPS and SNA. The present section is intended to introduce some conclusions formulated as a result of an analysis of conceptual differences with regard to capital formation flows distinguished in SNA and MPS which the Statistical Office undertook some time ago in order to prepare a basis for revising the document on SNA and MPS comparisons.

50. The differences in the concepts of capital formation flows employed in SNA and MPS appear to be of a lesser magnitude as compared with the concepts of production and consumption.

51. In both systems, the concept of capital formation is limited to the outlays on reproducible tangible assets and excludes outlays on intangible and financial assets and non-reproducible tangible assets, such as land, mineral deposits, standing timber and crops. Conceptually, the differences between the SNA and MPS flows of capital formation relate to (a) the treatment of capital losses, (b) the classification of outlays on partially completed construction, (c) the treatment of transfer costs in connection with the sales of land, other non-reproducible tangible assets and second hand sales, (d) the increase in stocks of monetary gold and (e) fixed assets purchased by embassies, consulates and other extra-territorial



bodies. On the practical level, there could also be some differences with regard to the classifications of repairs into capital and current which might affect the content of capital formation flows.

52. In MPS, the principal category of capital formation is computed on a net basis, namely, after the deduction of consumption of fixed assets, while in SNA, the opposite seems to be true, that is, more attention is paid to gross capital formation. At the same time, both systems ensure the information needed for the computation of capital formation, both on gross and on a net basis. However, it should be noted that there are some differences in the coverage of fixed assets consumption and in the valuation of that flow. The paragraphs below are intended to present more detailed comments on the differences between the concepts of capital formation in the two systems and on their significance.

#### 1. Capital losses

53. In MPS, capital losses of fixed assets are defined to include the written-off value of buildings, machinery and similar items which have been destroyed because of floods, fires and similar calamities and are shown in the material balance as a negative item in capital formation. At the same time, they are shown as a separate category of the final disposition of national income called "losses". Thus, those entries relating to the losses of fixed assets cancel each other out and do not affect net material product.

54. In SNA, similar capital losses are not shown explicitly in the production, consumption or capital formation accounts, but are rather shown explicitly in the reconciliation account. It should be noted, however, that capital formation is defined not only gross of consumption of fixed assets, but also gross of capital losses. That means that gross fixed capital formation (in the SNA sense) can be subdivided into two components: (a) additions to stocks of fixed assets and (b) the replacement of losses.

55. A less clear situation exists regarding the treatment of capital losses of stocks. In MPS they include any losses of materials and supplies and other similar items (classified as material circulating assets), owing to major calamities and to abandoned construction. In SNA, references to the treatment of losses of stocks are not detailed enough, and one may assume that they are implicitly allocated either to intermediate consumption (if the increase in stocks is defined as a difference between stocks at the beginning and at the end of the period multiplied by the average market price), or again, implicitly allocated to capital formation in stocks. In the latter case, increases in stocks can also be subdivided, theoretically speaking, into a net increase in stocks and the replacement of losses. National practices of countries using SNA appear to differ in that respect. Clarification of that point seems to be important because in that case, it may involve the comparability of data at the level of GDP/NMP and not just the comparability of data on the structure of GDP/NMP, as is the case with capital losses of fixed assets.

#### 2. Classification of outlays on partially completed construction

56. The classification of outlays on partially completed construction has been

discussed a number of times in the past, and a detailed discussion will not be presented here. It should be recalled that, while MPS allocates that item to an increase in stocks, in SNA, similar expenditures are recorded in fixed capital formation.

### 3. Transfer costs

57. In SNA, capital formation is defined to include transfer costs associated with the sales of second-hand assets, as well as with the sales of tangible non-reproducible assets and non-tangible assets. In MPS, capital formation does not include those items. Broadly speaking, they can be regarded in MPS as redistributive flows; however, national practices may differ.

### 4. Stocks of monetary gold

58. In MPS, stocks of monetary gold are treated as stocks of other material circulating assets. At the same time, in SNA, stocks of monetary gold are classified among financial assets. That difference appears to be largely of theoretical value and is unlikely to affect actual intersystem calculations. It is not suggested, therefore, that a special adjustment be included with regard to that item in the revised conversion tables.

### 5. Capital formation of embassies and other extra-territorial bodies

59. In SNA, the concept of capital formation is domestic, but it includes the outlays of embassies of the given countries on fixed assets; at the same time, similar expenditure by foreign embassies in a given country are excluded. In MPS, the "territorial" basis of the registration of all transactions requires a recording of the outlays in question on the territory of the given country. For example, according to MPS, capital outlays of foreign embassies in the USSR are shown as part of the Soviet capital formation. On the other hand, similar expenditure of Soviet embassies abroad will not be recorded.

### 6. Consumption of fixed assets

60. In SNA, the consumption of fixed assets measures the value of reproducible fixed assets used up during a period of accounting as a result of normal wear and tear, foreseen obsolescence and the normal rate of accidental damage. The flow is valued at replacement cost. In MPS, the concept of the consumption of fixed assets is, in principle, similar to the one employed in SNA, although there are some peculiarities. According to the official description of MPS, that flow, in addition to depreciation allowances, includes the undepreciated value of scrapped fixed assets (reduced by the value of scrap obtained as a result of scrapping). That component can be regarded as a measure of unforeseen obsolescence. It should be noted that country practices differ on that point. The original purchase value of assets is used as a basis of the valuation of the consumption of fixed assets, but the revaluation of stocks of fixed assets is held regularly every 8 to 10 years by many countries using MPS. Whether capital consumption calculated on that basis corresponds to the principle of value at replacement cost depends on the pattern of stocks and the life span of the assets in question, as well as on the period of time which elapses and the changes that take place in prices of capital goods from the time of acquisition to the following revaluation.

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61. There could be some other differences at the practical level with regard to the coverage of some types of fixed assets which are included in the calculations of capital consumption. For example, in some countries using SNA owing to practical considerations, the consumption of fixed assets is not computed for government roads, dams or breakwaters.

62. To summarize briefly, we have arrived at the following conclusions:

(a) There are no fundamental differences between the concepts of capital formation employed in SNA and MPS, and that makes it possible to work out a common concept of capital formation which could be used as a basis for international comparisons;

(b) The common concept of capital formation could be worked out on both a gross and on a net basis. In addition, some thought should be given to introducing, as a common concept, a category of "new capital investment" which would show the gross capacities in fixed assets (namely, capital repair is excluded from that category while included in gross capital formation). It should be noted that the concept of capital investment is widely used by CMEA countries outside of their national accounts to monitor fulfilment of state plans of capital investments. The CMEA concept of capital investments is defined to include capital outlays of economic units on construction, installation, purchases of machinery and equipment and cattle. It also includes outlays on certain intangible assets, namely, purchases of licenses, outlays on improvements of land and forest. By definition, capital investment includes outlays on fixed assets which are put into operation together with uncompleted investments (for example, work-in-progress in construction);

(c) In the course of the present work on the revision of both SNA and MPS, efforts should be undertaken to clarify the treatment of some items of capital formation and, above all, capital losses of fixed assets and stocks; effort should also be undertaken to explore the possibility of eliminating at least some of the differences mentioned above in the scope and classification of capital formation flows;

(d) Conversion tables designed for comparisons of the categories of final disposition of GDP/NMP should include adjustments which tackle the intersystem differences in (i) the treatment of capital losses of fixed assets and stocks, (ii) the classification of work-in-progress, (iii) the treatment of transfer cost and (iv) the scope and valuation of capital consumption.

63. On a practical level, no adjustments should be introduced with regard to the stocks of monetary gold and the capital formation of embassies. It is recommended that in each particular case, an analysis of national practices with regard to the scope and classification of capital repairs versus current repairs would be useful in the context of SNA and MPS comparisons.

### III. PROPOSALS FOR FUTURE WORK

64. Future work on SNA and MPS links should proceed in several directions. Major efforts should be made towards revising the document on those comparisons. The work on drafting the revised document should be carried out by the Statistical Office of the United Nations Secretariat in close co-operation with the Statistical Division of ECE. That work should be guided by the Commission's recommendations on that topic which were formulated at its twenty-first and twenty-second sessions and will be formulated at the present session. In particular, an account should be taken of the discussions held at the last sessions of the Commission on the selected conceptual issues of intersystem comparisons, such as the general approach to be used for the construction of the conversion tables, the treatment of capital losses, the treatment of external trade and the treatment of social and cultural services provided by enterprises to their employees. During the next two years, the draft of the revised document should be prepared for discussion at a meeting of experts on national accounts and balances.

65. Work on experimental illustrative calculations of GDP for selected centrally-planned economies and for NMP for selected market economies should continue with the same objectives, namely, the testing of the conceptual framework, the accumulation of experience in collecting and processing primary data and the ensuring of input for further work on the improvement of methodology. Efforts should be made to encourage bilateral intersystem comparisons. It is hoped that Bulgaria and Finland will start their own comparisons and will be joined by other countries.

66. The Statistical Office should continue studying the possibilities of collecting countries' own estimates of GDP/NMP with the help of special tables introduced in questionnaires on national accounts and balances.

67. Preparatory work on the revision of the glossary of SNA/MPS terminology should be started in the framework of co-operation between the secretariats of ECE and CMEA.

68. Work on the total consumption of the population should be resumed. Some conceptual problems in that area seem to require clarification. It should be noted that there are certain discrepancies with regard to the treatment of certain items and categories relating to total consumption of the population in the documents released on that subject by the United Nations Secretariat and the Council for Mutual Economic Assistance.

69. Among other directions of work which can be pursued in the near future, mention should be made of the following:

- (a) The preparation of a conversion key for intersystem comparisons of stocks of reproducible tangible assets;
- (b) The adaptation of SINS for international comparisons;
- (c) The intersystem comparisons of productivity;
- (d) The development of a "common concept of capital formation".

70. As was noted in the report of the Working Group on Statistical Programmes held at Geneva in 1982, there was a growing interest in the study of SNA and MPS links during the past years and, in particular, by ESCAP and ECLA and several of their member countries. It should be remembered in that connection that, in 1982, ECLA, in co-operation with the Government of Cuba, organized a seminar on the study of SNA/MPS links in the Latin American region. It is hoped that the interest in that topic provoked by the seminar will be exploited during the coming years. The organization of bilateral comparisons in that region would be a particularly useful undertaking.

71. Other possible areas of study of SNA/MPS links which were on the agenda of the Commission but were not accomplished owing to a lack of resources are the following: (a) a comparative analysis of institutional sectors in SNA and MPS and (b) a description of the peculiarities in national practices in the computation of SNA and MPS, in the context of intersystem comparisons.

#### IV. POINTS FOR DISCUSSION

72. The Commission may wish to discuss the general status of work on the study of SNA/MPS links and, in particular, the progress made with regard to the experimental illustrative calculations and improvements in the conceptual framework for intersystem comparisons. The Commission may also wish to give some attention to discussions of some of the conceptual issues of SNA/MPS comparisons and, in particular, to the treatment of external trade flows. The Commission may wish to comment on the proposals with regard to the future work in the area of SNA/MPS links.

#### Notes

1/ The results of the first round of calculations are given in the publication entitled Comparisons of the System of National Accounts and the System of Balances of National Economy, (United Nations publication, Sales No. E.81.XVII.15).

2/ ST/ESA/STAT/SER.F/20 (Part I) (United Nations publication, Sales No. E.77.XVII.6).

3/ Global Econometrics, Essays in Honor of Lawrence K. Klein (The MIT Press, Cambridge, Massachusetts and London, England, 1983).

4/ The general principles of the framework are set out in the publication entitled Comparisons of the System of National Accounts and the System of Balances of the National Economy (United Nations publication, Sales No. E.81.XVII.15).

5/ ST/STAT/SER.F/17 (United Nations publication, Sales No. E.71.XVII.10).

6/ That balance is a counterpart of SNA production, consumption and capital formation accounts.

Notes (continued)

7/ Converted into domestic currency of a given country with the help of official exchange rates.

8/ Those peculiarities can be described briefly as follows: principles underlying domestic prices of exports versus imports differ; foreign trade prices differ depending on country partner; the application of exchange rates leads to substantial differences between net exports obtained with their help and net exports in domestic prices.

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