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CONCEPTS AND DEFINITIONS OF CAPITAL FORMATION

(Memorandum prepared by the Secretary-General)

(33 p.)

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(a) To draw the attention of Member Governments to the importance of preparing periodic estimates of the volume and structure of capital formation;

(b) To suggest that Member Governments at present preparing or planning to prepare statistics of capital formation should review possibilities of improving the comparability of such estimates with those of other countries;

(c) To continue the technical studies and consultations with Member Governments for the development of standard concepts, definitions and classifications relating to capital formation and to report on the subject at the next session of the Statistical Commission.

5. Since document E/CN.3/129 was discussed by the Statistical Commission, comments have been received on that document from about twenty countries and several international organizations. These were taken into account in the preparation of an earlier version of the present paper. The replies of a number of countries included information on their own methods of estimation which has helped to broaden the point of view adopted in that paper, and to make it more inclusive of the problems of different countries. The earlier version was then circulated to the members of the Statistical Commission for further comments. In so far as practical these comments have been incorporated in the present paper.

6. It should be recognized that a paper purporting to set forth standard definitions and classifications on such a complex economic area must inevitably be a compromise between the different uses to which the estimates of capital formation are put and the statistical resources available in the several countries. While the present report is confined to the definitions and classifications of the concepts, considerations of their measurement could not be omitted in choosing between the alternative formulations. While in a few instances it has been felt desirable to indicate alternative treatments recognition of the need for clear-cut standards, if international comparability is to be furthered, has forced a choice in most instances. For those countries with severely limited statistical resources the definitions and classifications adopted represent a goal rather than a currently attainable standard.

7. Within the scope of the limitations noted the purpose of this paper is to provide a set of definitions and classifications of capital formation for approval by the Statistical Commission.

I. INTRODUCTION

1. Work at the international level on measurement of capital formation goes back to a study, Statistics Relating to Capital Formation: A Note on Methods (Studies and Reports on Statistical Methods No. 4) published by the League of Nations in 1938. This report, which was prepared by the League of Nations' Committee of Statistical Experts, had its origin in a resolution of the Council of the League, in accordance with a recommendation of its Financial Committee, requesting the Committee of Statistical Experts to take up the question of financial statistics and to study and report upon the methods by which the comparability of financial statistics might be improved. Following a suggestion made by the Financial Committee, the work in this field had been directed at the outset to a study of the "statistics relating to the formation of capital and the manner in which that capital is invested."

2. At its fourth session the Statistical Commission expressed the view that there was an urgent need to bring up to date the report of the League of Nations Committee of Statistical Experts to take advantage of recent experiences in compiling statistics of capital formation (E/1212, paragraph 76).

3. At its fifth session the Commission received a memorandum by the Secretariat on the progress of work on national income, capital formation and other related subjects (E/CN.3/89). The Commission requested the Secretariat to include in its study on methods for measuring capital formation a survey and analysis of the methods used in various countries which obtain estimates of capital formation by means of questionnaires addressed to the enterprises or agencies in which the investment takes place. It also recommended that the technical study on capital formation be completed (E/1696/Rev.1, paragraphs 72 and 75).

4. The memorandum, Statistics of Capital Formation (E/CN.3/129), prepared by the Secretary-General, was presented to the Commission at its sixth session. While it was not possible to discuss fully the memorandum at that session the Committee noted that the formulation of standard concepts, definitions and classifications required further study and consultation with interested governments. The Commission desired that such study and consultations should include the collection of detailed information on recent experiences in compiling statistics of capital formation. The Statistical Commission, therefore, requested the Secretary-General:

Changes in stocks of general government

13. Increases in stocks of general government are regarded as capital formation by one of the countries commenting whereas another recommended they be excluded.

Transfers of used assets

14. Several countries commented on the proposal to include used assets as capital formation of the acquiring sector as conceptually desirable but statistically rather difficult. One country opposed including them.

Capital outlays normally charged to current expense

15. Two countries suggested departing from the accounting treatment of such items as hand tools and office equipment and the adoption of a uniform treatment in order to obtain international comparability in the definition of capital formation. One recommended their uniform exclusion while the other proposed they be included in capital formation.

Repairs and maintenance

16. One country suggested that virtually all expenditures for repair and maintenance of capital assets be included in capital formation and also in the measure of capital consumption.

Capital consumption

17. Three countries suggested it desirable to recommend the making of capital consumption estimates on a current or replacement cost basis. One of them indicated that estimates be made in terms of both current and historical cost. One country stated that depletion of natural resources should be treated as capital consumption even though their value is not included in the measure of capital formation. Another proposed that accidental damage be defined as the value of fixed capital destroyed rather than that portion covered by insurance.

18. Other comments dealt with the treatment of land, natural resources, intangible assets such as patents, goodwill and research, and the measurement basis for work in progress. Opposition to the proposal for the general adoption of the terminology used in the report was also stated by one country.

III. BASIC CONCEPTS

Definition of gross and net capital formation

19. All goods produced for use in future productive processes - machinery, equipment, plants, other buildings and structures, and producers' stocks of raw materials, semi-finished and finished goods - are called capital goods.

II. SUMMARY OF COMMENTS RECEIVED FROM MEMBERS OF THE STATISTICAL COMMISSION

8. The following paragraphs summarize the major comments received from members of the Statistical Commission on an earlier draft of this paper which was submitted to them 26 June 1952 The present paper represents a revision of the earlier version in the light of these comments and the further consideration of a number of points by the Statistical Office. Owing to the divergent treatment suggested in the comments on particular points it has not been possible to adopt all of the proposed formulations. The comments on the more important items are summarized by topic.

Domestic capital formation

9. Several countries questioned the usefulness and feasibility of the distinction drawn between foreign agencies of domestic concerns and their foreign branches and subsidiaries for the purpose of defining domestic capital formation. Some of these countries suggested that domestic capital formation be defined solely in terms of the physical location of the capital assets instead of including capital acquired abroad by the agents of domestic concerns.

Government enterprises

10. One member suggested that government enterprises be distinguished from general government by a simple enumeration of the former's agencies. Another indicated the need to define general government in terms of the functions performed in order to obtain international comparability in the distinction between general government and government enterprises.

General government capital formation

11. Several comments indicated the desirability of including capital expenditures of general government in the concept of capital formation. Two countries indicated agreement with a definition of capital formation which limited it to capital expenditures of enterprises and private non-profit institutions but noted the desirability of distinguishing between the current and capital expenditures of general government.

Military expenditures

12. One country suggested including government arsenals and shipyards in domestic capital formation. Another indicated the desirability of treating military expenditures for land as capital formation of the general government sector.

expenditures which involve the creation of structures such as the drilling of wells or the digging of mine shafts be included in capital formation. Although the inclusion of such expenditures may not and generally will not provide for including the full value of the resources exploited in capital formation, the extraction of these resources are considered as a charge to current output. Inclusion of depletion allowances as a form of capital consumption is based on the view that such resources represent non-reproducible national assets not entirely dissimilar to stocks of raw materials.

Domestic capital formation

24. The concept of capital formation used here is limited to expenditures of enterprises, non-profit institutions and general government for physical capital assets located within the territory of the country plus net changes in stocks owned by resident enterprises. Net changes in foreign investments are excluded since the concept of capital formation is designed to measure changes in the physical capacity of a country's economy.

25. The concepts of "territory" and "resident" as used in this report are the same as those underlying statistics of national income and expenditure in general. The territory of a country is defined by its political boundaries. For the purpose of national income estimates overseas territories and dependencies are treated as foreign countries.

26. Resident institutions are defined in accordance with the Balance of Payments Manual and include all government and private organizations located in the country and their foreign agencies but not their foreign branches or subsidiaries. Agencies are distinguished from branches and subsidiaries in that they act on account of their principals whereas the latter may act on their own account.

27. Since foreign agencies of domestic concerns are not likely to acquire fixed capital whereas they frequently purchase stocks of commodities for the account of their principal, the contribution of these agencies to domestic capital formation is limited to their acquisition of stocks. This treatment preserves consistency with the Balance of Payments Manual which, at least conceptually, includes the acquisition of such stocks by agencies located abroad in the import statistics, as adjusted for use in computing the balance of payments, of the country of the principal at the time of their acquisition. Thus, as defined in the Balance of Payments Manual such stocks are regarded as imports and consequently part of a country's physical working capital.

<u>Capital formation</u> is that part of a country's current output and imports which is not consumed or exported during the accounting period but set aside as additions to its stock of capital goods. <u>Net capital formation</u> is distinguished from <u>gross capital formation</u> in that it is measured after allowances are made for depreciation, obsolescence and accidental damage to fixed capital. Conceptually, net capital formation represents the addition to fixed and working capital available for future production

20. Future production is facilitated not only by net additions to a country's stock of capital goods, but also by increases in technical training and knowledge of the population, improvement in health and living conditions, etc. Thus, depending on the purpose for which the statistics are to be used, the range of items included in capital formation may vary from a narrow one, as for example physical plant and equipment, to one which includes also current expenditures for research, health, and education which improve technology and increase productivity of the labor force. While it is desirable to obtain data on such expenditures they have not been included as capital formation owing to the difficulty of valuation.

21. For some purposes, such as estimates of national wealth or of saleable assets, which might be used to obtain foreign exchange, certain intangible assets such as patents, concessions and good will might be included. These items are omitted from the concept of capital formation used here both because of the difficulty of valuation - in general their exchange value approximates the capitalized value of the earning power they represent - and because there is no clear-cut relationship between such a value and their contribution to future production for the nation as a whole.

22. Except for dwellings durable goods purchased by households are not classed as capital formation but are treated as consumption. This treatment is adopted more for practical reasons, such as the difficulty of estimating depreciation and the fact that the services they yield are generally not marketed, rather than on strictly logical grounds.

23. Inventories of museums, works of art and other collectors' items are omitted as well as discovery of sub-soil resources such as petroleum or minerals. In both cases the problems of valuation are very difficult. The value of sub-soil resources generally does not bear a close relationship to the cost of discovery. While estimation of the latter appears possible it is recommended that only those

Justice includes the law-courts, police and prisons.

Education and research includes schools, universities, libraries, museums and all research activities performed by the government except those of a purely military character.

Public health includes hospital and other medical services provided to civilians.

Welfare services include the provision for treatment, education and other care for the aged, infirm, indigent and otherwise handicapped persons and expenditures for child and maternal welfare.

Transport and communications facilities comprise the provision of roads, airports, canals, harbours and other transport facilities including navigational aids and radio and meteorological services provided in connection with transport facilities.

Other services include the provision of recreation, fire protection, sanitation and other public housekeeping services. In addition it includes expenditures in connection with religious activities as well as pensions not included elsewhere.

30. It is recommended that the same statistical definition of capital formation used for private enterprises be applied in the case of government enterprises.

31. Private non-profit institutions are defined to include associations organized to provide a collective method for the consumption of goods and services by both individuals and business. In general, the major portion of their costs are covered by public and private grants and yields from endowment. Hence, expenditures are used to measure their product rather than the proceeds from service charges. Private non-profit organizations which cover all or nearly all of their expenses by direct charges are more properly classified as private enterprises, especially if their charges are competitive with those of private profit institutions. Private non-profit institutions, in so far as they possess fixed capital and only as such, are treated as enterprises and their capital formation is included in gross domestic capital formation.

Capital consumption

32. Conceptually, capital consumption represents the decline in value of durable capital from wear and tear, obsolescence or accidental damage over the accounting period, or alternatively equals that portion of currently produced capital

Enterprises*

28. Enterprises include both private profit and government agencies generally regarded as of a business nature engaged in producing goods and services. Private enterprises include all forms of private commercial activities whether organized as a corporation, partnership, cooperative or sole proprietorship. The ownership of dwellings is treated as a form of enterprise.

Government enterprises are generally defined as those agencies of government which cover a substantial portion of their costs by the sale of goods and services, and, depending on the institutional arrangements in the particular country, perform functions generally classed as business rather than as purely government administration. It is not possible to frame a precise definition owing to the fact that depending on the institutional arrangements government enterprises as a class merge imperceptibly with the activities of general government. Agencies chiefly engaged in the regulatory functions of government are not included, nor are those furnishing social insurance. Government arsenals and naval ship yards are excluded from enterprises by the general rule that classes all military activities as functions of general government.

29. Since the range of activities performed by government enterprises is necessarily broad, one method to distinguish them from general government is to define the latter in terms of functions characteristic of general government. All other activities would then be regarded as being performed by government enterprises.

General administration comprises all legislative and such executive functions as international relations, fiscal administration, the operation of social security programs, the regulation of commercial activities of business, labor, agriculture, etc., and the preparation of statistical and other information.

Defence comprises the armed forces, civil defence and the government establishments organized for research on and the manufacture of weapons and other munitions.

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* Unless otherwise noted, private non-profit institutions will be included in the term enterprises as used below.

their inventories of durable goods but does not remove the need to adjust such shipments' data, at the producers' level, for changes in distributors' inventories of capital goods.

36. Hence, excluding the problem of distributors, it is necessary to add the decrease or subtract the increase in producers' inventories of capital goods from the measure of production. Use of either production or shipments data of capital goods producers requires they be adjusted by the change in distributors' stocks in order to approximate a measure of capital goods acquired by their ultimate users.

37. In addition to production, inventory and external trade data for capital goods, the commodity flow approach requires extensive supplementary information; data on transport costs, dealers' margins and purchased services in connection with the acquisition and installation of fixed capital goods, is needed to supplement production data since capital formation is valued at cost to the user of the capital goods. Since production data, in general, covers all types of output it is necessary to distinguish between final and intermediate products, that is those flowing to ultimate users as capital formation or consumption and those products which comprise inputs for further processing or for the repair and maintenance of equipment.

38. In general, adoption of the production approach permits:

1) Classification of capital formation by major product groups and industries producing the goods; and

2) The definition of the items comprising capital formation to be made by the statistician rather than by the business accountant

Adoption of the expenditure approach generally implies acceptance of the accountant's definition of capital expenditures except for such items as financial claims, patents, trademarks and other intangible assets which are generally separable from fixed capital expenditures. The derivation of capital expenditures from accounting data in general results in estimates which:

1) Reflect business decisions as to what items constitute depreciable assets;

2) Insure a degree of internal consistency in the national accounts, provided accounting data is used to determine profits and depreciation allowances; and

formation required to maintain intact the stock of physical assets. Neither of these concepts is directly measurable without specifying a valuation basis and a definition of capital. Because of the difficulty of defining and measuring real capital the measures used have generally related to maintaining money capital intact. This matter is treated in paragraphs 76 through 97.

IV. DEFINITIONS OF EMPIRICAL EQUIVALENTS

Measurement by expenditure and production data

33. Capital formation may be measured at any of several steps in the process, e.g., the accumulation of funds, expenditure of the funds or the production of capital goods. Since the first deals with the flow of funds and is not directly related to production, it will not be considered here.

34. Fixed capital formation may be defined as the expenditures for machinery, equipment, buildings and other structures by enterprises and general government. Measured in this fashion capital formation is related to increases in productive capacity of enterprises as defined, in general, by their accounting classification of expenditures between capital and current accounts and of general government in terms of the definition of fixed capital used by the statistician. Capital expenditures are defined to include the purchase price of the fixed assets plus such expenses as those for transportation, brokerage, installation, engineering, architect, legal and other services and indirect taxes. Conceptually, the investment cost includes the services furnished by employees of the purchaser in connection with the purchase and installation of fixed capital. Practically these must generally be omitted except when such costs are capitalized.

35. In the production or commodity-flow approach fixed capital formation is measured in terms of domestic production plus imports of capital goods less those, other than dwellings, sold to households or exported. Since fixed capital formation is usually defined as the acquisition of durable physical assets by their ultimate users plus work in progress on durable heavy equipment and construction, it is necessary to adjust data on production by changes in the inventories of capital goods held by their producers or distributors in order to estimate the flow of capital goods to ultimate users. The use of data on producers' shipments of capital goods avoids the need to adjust for changes in

the selling sector. For this purpose the transfer of land used for military purposes is included with other used asset transfers of general government. The ownership of land by individuals is considered a form of enterprise and those transfers are included with used asset transfers of that sector.

43. As with other used assets the transfer of land should be recorded at the current purchase price. In addition such transfer costs as legal services fees, taxes, etc., are included as capital formation of the sector making the expenditure and unlike the purchase price of the asset increase total capital formation. In this treatment capital gains and losses affect capital formation of the individual sectors but not of the economy as a whole.

Treatment of gold

44. It is recommended that all changes in domestic stocks of gold, including those held by the monetary authorities, by individuals and by enterprises, be regarded as changes in net foreign investment. Thus, changes in gold stocks are excluded from domestic capital formation. This treatment differs from that used in the Balance of Payments Manual of the International Monetary Fund by including as net foreign investment increases in all private gold stocks. The non-monetary gold movement in the Balance of Payments Manual must therefore be adjusted for changes in these stocks comprising private hoards, partly worked gold for personal use and industrial stocks. Thus current gold production less that consumed in industry and the arts is regarded as adding to foreign investment during the period.

Capital formation of general government

45. Capital formation of general government is defined in a similar fashion to fixed capital formation of enterprises and includes expenditures for machinery, equipment, buildings and structures. Included in the latter are roads, canals, harbors and other transport facilities and structures including navigational aids. Capital formation of general government also includes expenditures for the conservation and development of natural resources which are of a relatively permanent character and involve major alterations to the terrain such as drainage, reclamation, flood control, reforestation and similar projects.

Capital formation of general government is limited to capital expenditures for civilian purposes and excludes all military expenditures except those for permanent housing.

3) Avoid the necessity of providing detailed definitions of capital as distinct from current expenditures in the instructions accompanying questionnaires.

On the other hand, acceptance of accounting measures of capital expenditures:

1) Involves a lack of uniformity in the definition of capital as between firms, industries and countries; and

2) Likely involves an understatement of capital formation since, in general, business practice tends to charge to current expense items of relatively small cost or short life even though the latter may considerably exceed one year.

39. The choice between the production and expenditure approaches is, of course, largely dictated by the statistical resources available. While it is recommended that the expenditure approach, including with some exceptions the use of accounting definitions of capital expenditures, be adopted for preparing estimates of capital formation, this recommendation is to be construed as general in character. It should be followed only in so far as practical alternatives do not yield estimates which correspond closer to the suggested concepts.

Treatment of land

40. Land is regarded as a capital asset and with certain exceptions is treated in the same fashion as other used assets. Since capital formation is defined as the acquisition of capital assets only the reclamation of land represents an addition to a country's capital formation. Land acquired by an extension of a country's political boundaries is not included since such acquisition does not represent a normal charge against current production. All durable improvements to land such as drainage, irrigation, clearing of forests, grading, etc., should be included in capital formation of the period when the improvements are made.

41. The discovery of sub-surface mineral or petroleum deposits while enhancing the value of land are not included in capital formation, nor are the expenditures for such exploration, except as they involve expenditures for durable structures such as wells and mine shafts.

42. Since for analytical purposes it is desirable to account for the transfer of used capital assets, it is recommended where possible that the acquisition of land, together with improvements be treated as capital formation of the purchasing sector. Similarly the sale of land is treated as negative capital formation of

exceptions noted, are excluded from capital formation of general government as well as from domestic capital formation

50. It is proposed that military expenditures should be shown separately from other current expenditures of general government. Military expenditures for equipment, buildings, structures and stocks are defined as expenditures for items destined for use by military personnel for purposes of national defence. Owing to the differences in the position of the military establishment in the various countries as well as the fact that many types of expenditures contribute to defence as well as to the needs of the civilian economy the practical definition must be left to the countries concerned. It is proposed to include expenditures for government arsenals, naval shipyards, barracks, cantonments, military flying fields, etc. as military expenditures. Stockpiles of strategic materials available for military and civilian use should be included in capital formation of government enterprises unless held by the military establishment or in case local considerations indicate a different treatment to be more satisfactory.

51. Expenditures of general government for the development and conservation of natural resources are treated as capital formation only to the extent they result in the creation of durable physical assets. Structures such as dams, levees, dykes, canals, wells, mine shafts as well as expenditures for reforestation are included in capital formation. Expenditures for forest fire protection, eradication of pests, reseeding of grasslands, and research which do not involve the building of durable physical assets are regarded as current outlays.

52. Stocks of general government are likely small and not subject to rapid change so that their omission from estimates of capital formation is not a serious deficiency. The major exceptions are stocks of surplus agricultural commodities and strategic materials. In the event the government agencies holding such stocks are not classed as government enterprises consistent treatment would call for their exclusion from gross capital formation. In general, it is desirable to include agencies holding such stocks as government enterprises even though they lack other characteristics of such agencies. Sale of surplus stocks by general government, including the military establishment, except as noted above, are treated as a decrease in current expenditures of general government. The purchase of these as well as other stocks by enterprises are included as capital formation in stocks to the extent they increase the end-of-period stocks of enterprises.

46. The inclusion of roads, canals, harbors and similar developments raises difficult problems of distinguishing between capital expenditures and those for maintenance and repair which, in general, are of a current nature. The problem is complicated by the difficulty of defining capital consumption for capital assets which are of an essentially permanent character provided adequate maintenance is undertaken. Two alternatives are suggested. The first is to treat all major maintenance and repair expenditures such as resurfacing roads and redeveloping harbors and canals as expenditures on current account and to omit capital consumption allowances for these items. In effect this treatment assumes that current expenditures merely maintain the economic life of such assets. The other method is to include as capital formation all expenditures for maintenance and repair such as the dredging of harbors and the resurfacing of roads and to include an allowance for their loss of economic value in estimates of capital consumption, on the basis of an estimate of the expenditures required to maintain their original condition.

47. Owing to the joint use of many buildings by government agencies performing diverse functions, it is proposed that the classification of fixed capital formation of general government be limited to schools, hospitals, other buildings, highways and related structures and other construction. It is desirable to show estimates for equipment separately.

48. All <u>military expenditures</u> should be classed separately from other expenditures of general government. This treatment is dictated by a number of considerations, chief among which are:

(i) The difficulty of distinguishing between current and capital expenditures for defence,

(ii) The inability to formulate a generally useful definition of capital consumption,

(iii) The fact that military expenditures seldom increase the productive capacity of an economy, and

(iv) The inability to devise a valuation criterion comparable with that of the civilian economy.

49. All military expenditures except those for land and permanent family dwellings are treated as current expenditures of general government and as a result military expenditures for durable assets and changes in stocks, with the

Development costs

56. Substantial development expenses may be incurred in the case of large-scale investments such as the construction of a plant or a major resource development, for example, an integrated hydroelectric system. Conceptually, these should be capitalized and amortized over their productive life. Often these expenses are charged to current account if the investment is made by a going concern. Common practice appears to be the capitalization of developmental expenses only when the firm is new or not producing satisfactory profits against which to charge the expenses and to amortize them as rapidly as the profit position permits.

57. It is recommended that development expenditures not directly associated with the acquisition or construction of physical capital assets be excluded from gross domestic capital formation. This treatment is based on the difficulty of adequately defining development expenses some of which are probably very much like expenditures for research or education, i.e., they may build up a reservoir of knowledge or skills available in some degree for many purposes besides that of a specific capital expenditure.

Financing costs

58. The direct and indirect financing costs in providing investment funds are excluded from fixed capital expenditures and instead treated as a current expense. This omission is based on the difficulty of obtaining data on such costs including the allocation of flotation and other such expenses between fixed and working capital. In addition, the inclusion of financing costs would lead to a degree of non-comparability between government capital formation and investments of private enterprises out of retained earnings and those by enterprises resorting to the capital market.

Gross domestic capital formation

59. Gross domestic capital formation is defined as the expenditures of enterprises and general government for new and used capital assets physically located in the territory of a country plus the value of the physical change in stocks owned by resident enterprises whether held domestically or abroad.

Measurement of transactions

60. Since transactions which reflect capital formation as well as other economic activities are generally divided into a number of separate aspects which occur over time, it is possible to measure the transaction at one or another of its

53. <u>The transfer of physical assets between civilian and military agencies of general government</u> poses an awkward problem because of the difficulty of distinguishing these sectors. In some instances agencies which are normally regarded as performing civilian functions acquire a military status. Since the magnitude of these transfers is likely to be small for the most part, and since expenditures are classified differently as between capital and current for the two branches, it is recommended that transfers of durable assets between these branches of general government be neglected.

<u>Transfers of used assets</u>

54. Conceptually it is desirable to include the acquisition of used as well as new capital assets as capital formation of the acquiring sector, and it is recommended that this be done if information is available. If included used capital assets should be shown separately from new capital formation both for the estimates of the acquiring as well as the disposing sector. Except for transfer costs such as those for transportation, brokerage and installation the inter-sector purchases and sales of used assets will not alter the total of domestic capital formation. The decision to include the sales and purchases of used assets between sectors as well as between industrial classifications in the sector for enterprises rests in part on the difficulty of distinguishing between inter-industry and inter-sector transfers as well as on the fact that inclusion of such transactions will help to insure proper treatment of their transfer costs.

55. Since it is desirable to show net as well as gross (including used assets) flows in the sector and sub-sector estimates of capital formation, expenditures for used assets should be obtained separately from other capital expenditures. If because of lack of data, only the flows of new capital assets are shown the transfer costs of used assets such as transportation, brokerage, installation fees and indirect taxes should be included as capital formation, of the industry acquiring the asset. Transfers of used capital assets are recorded at their purchase price as negative capital formation of the selling sector and as positive capital formation of the sector acquiring them. Since this price will generally differ from net book value, i.e., cost less accrued depreciation, it may include capital gains or losses. These will not affect total capital formation but only that of the sectors.

65. In some instances large numbers of vessels are transferred to foreign registry owing principally to the less costly regulations of the foreign country. The transfer of registry may be accompanied by the transfer of ownership, generally to a wholly owned foreign subsidiary chartered in the country of registration. In such cases the ownership criterion fails to reflect the country of beneficial ownership. To effect a more realistic classification it is suggested that in such cases the nationality of the parent company be used to determine domestic capital formation.

Prepayment by non-residents

66. Prepayments by foreign residents for equipment having a long period of construction such as ships and aircraft being built for export, are included in the capital account of the Balance of Payments Manual of the International Monetary Fund unless such payments are deemed to have transferred ownership to the foreign purchaser. In the latter case the work in progress is included in the net foreign investment account as an export. If ownership has not been transferred the value of the work in progress is included under transport or other equipment as fixed capital formation of domestic enterprises.

Distinction between capital and current expenditures

67. Conceptually expenditures for physical assets having an economic life exceeding the length of the accounting period should be classed as capital formation. Practically this criterion cannot be strictly followed. While the production approach requires this distinction to b made by the investigator in terms of products, the expenditure approach delegates this task to the business man or accountant, guided by the instructions of the investigator. Since practical considerations largely require the latter to be stated in general terms and since the accountant has already made the distinction for his purposes, it is generally not feasible to requ st a classification of expenditures which do not take into account these factors.

68. In general accounting practice departs from a strict length of life criterion by excluding from the capital account those items, the replacement rate of which is fairly constant, and/or which are of relatively small value such as hand tools and office furniture and minor equipment. In certain instances large expenditures such as the drilling of oil and gas wells are charged to current account where tax laws permit. While acceptance of accounting practice has been recommended

aspects, e.g., orders, acceptance of orders by sellers, shipments, physical receipt of the item, issuance and receipt of invoice, date payment due, date of actual payment as well as time of installation of equipment or readiness of the structure for use. Since these aspects of the transaction may extend over more than one accounting period, the choice of aspect to measure will affect the totals of a period.

61. It is proposed to adopt the rule of recording transactions at time when the purchase (sale) is recorded as a liability (asset). Expenditure and receipt when used here have the same meaning. To the extent different practices prevail in various countries this rule will lack uniformity while preserving the necessary flexibility to enable business practice to be adopted in large measure.

62. Work in progress on construction and heavy fixed equipment is most conveniently measured in terms of value in place or payments due if the construction is being done on contract. While the former concept appears most appropriate from an economic standpoint the latter can be more easily measured if the expenditure approach is used.

63. Expenditures in general reflect prices current at the time of the purchase. Since, as used here, the term prices covers the unit expenditures for dissimilar types of goods and services the term is not limited to the prices prevailing on well-organized markets. It includes taxes, fees, or retainers paid for purchased services in connection with capital investment produced internally such as construction undertaken by the firm's own employees. This fact is of importance primarily in deflating expenditure series to a constant price.

Treatment of transport equipment

64. Ships and aircraft are an exception to the general rule of classification on the basis of physical location. Frequently vessels are leased or chartered for long periods to foreign operators. To what extent this transfer has the effect of adding to the physical capital of a country appears to depend on the use to be made of the estimates. If an analysis of employment opportunities is of chief interest, the acquisition of vessels by lease as well as sale might properly be included in domestic capital formation. Due to the divergent uses made of such estimates as well as the difficult problems of ascertaining the transaction and assigning a valuation to leased vessels, it is recommended that ships and aircraft be included, except as noted below, on the basis of the nationality of their owner.

properly maintained, though their economic life is unpredictable. It is proposed to include as capital formation all alterations or repairs which alter the services originally provided by the structure. All other expenditures would be treated as maintenance and charged to current expense. On this basis expenditures for replacing major parts of buildings and other structures would be included as capital formation while those for redecoration, painting, etc., unless involving a major change in use, would be excluded.

Valuation of changes in stocks

73. Net changes in stocks are included in capital formation at the value of the physical change in stocks rather than at the change in the book value, since it is the former which measures the increase or draft on stocks resulting from current production and consumption. The change in the book value of stocks which is generally used by accountants in computing profit is affected by price changes occurring over the accounting period and does not reflect the current price relations of inputs.

74. Following the principle of excluding capital gains and losses from the concept of national income and the valuation of capital formation the net change in stocks is usually adjusted to exclude the effect of these price changes. This adjustment rests on the same conceptual basis as the practice of adjusting capital consumption to current or replacement cost. However, statistically and in terms of the national accounting aggregates the two adjustments differ substantially. The concept of replacement cost valuation for capital consumption differs in a marked degree from that for changes in stocks. Operationally defined the replacement cost of stocks has the same meaning to the business man as to the economist since, over the short period stocks are normally held, there are generally only slight changes in their economic and physical characteristics. Consumption or sale of stocks generally contemplates replacement with reasonably identical or closely similar items.

75. A further basis for distinguishing between the valuation of stocks and capital consumption is found in the makeup of the aggregates. Net changes in stocks are included in gross capital formation and directly affects the gross expenditure total. Capital consumption estimates are primarily useful in comparing the aggregate derived from income with that derived from production or expenditures and rve a secondary purpose in the derivation of net capital

considerations of international comparability indicate the desirability of adopting uniform conventions where feasible. Hence it is recommended that capital expenditures of the type mentioned be uniformly treated as capital formation.

Repairs and alterations

69. Theoretically expenditures for new capital equipment and structures including expenditures which extend the normal life or raise the productivity should be included in capital formation. Thus major alterations, renovations and rebuilding are capital expenditures. Routine care such as cleaning, oiling, adjusting and the replacement of short-lived parts are current expenditures.

70. The treatment of repair costs which do not extend the normal life of the equipment but which involve the replacement of parts having a life expectancy longer than the accounting period present a difficult problem. To the extent that business accounting practice seeks to avoid sharp changes in profits by capitalizing the cost of major repairs, while treating the less costly ones as current expense, the durability criterion is discarded and estimates on that basis become difficult to obtain. While it is recommended that only those repair costs which materially lengthen the anticipated economic life of the asset or raise its productivity be treated as capital formation, practically it is most convenient and generally necessary to accept business accounting practice if the expenditure approach is used. Detailed instructions on special questionnaires may be used to obtain a modified treatment in line with the above recommendations.

71. Use of the commodity-flow method for estimating capital formation generally requires that the distinction between capital formation and maintenance and repairs be made by segregating output between that used as repair parts and as final products. Frequently this distinction must be somewhat arbitrary and as a consequence the measurement of capital formation will be affected by the choice of approach.

72. The distinctions between repairs and alteration of buildings and other structures are often ambiguous. In principle repairs should be confined to expenditures designed to maintain the operating efficiency of the structure in the prior use to which it has been put, without involving an extension of its normal life. Repairs which extend the normal life expectancy are clearly capital expenditures. Some structures appear to have an indefinite physical life if

consumption as a balancing item between national income and gross product rather than regarding capital consumption in the economic sense as a measure in current prices of the loss in value of physical capital. Thus conceived capital consumption represents that portion of current receipts not considered as a factor share but rather as determined in the process of net income allocation by business subject to accounting conventions and tax regulations. Only indirectly does it measure the decrease in physical productivity or the loss in terms of current prices in the valuation of capital plant.

79. The accounting concept of capital consumption has been generally defined in terms of the actual charges made to income by enterprises plus the claim payments for accidental damage to fixed assets. These charges are generally confined to depreciation and depletion allowances and provisions for extraordinary obsolescence.

80. Depreciation is defined as the periodic allocation to operating expenses of the cost of physical assets over their economic life. As such it covers the effects of wear and tear and obsolescence. The latter represents the loss in economic value from other than physical deterioration. Special allowances for abnormal obsolescence when permitted by the taxation authority are also included as capital consumption. Usually this involves writing off the depreciated book value as a charge to current income. It should not include charges, even where made, which exceed the book value at the time of the write-off. Occasionally the taxation authorities permit larger than normal depreciation allowances during the first year of the life of new fixed capital or a shortening of the normal period for the writing off of the cost of certain types of assets. Since these policies often lead to a substantial rise in depreciation allowances for a short period it is desirable that these special allowances be segregated and shown separately from the normal allowances.

81. Accountants frequently distinguish between depreciation and amortization; applying the former to buildings and other replaceable physical assets and the latter to intangibles such as bond premiums, organization costs and patents. Only to the extent that these investment expenditures are considered as capital formation is it proper to include their amortization allowances as capital consumption. Depletion allowances which represent the exhaustion of a wasting resource are included in the accounting measure of capital consumption, only when permitted by the tax authorities. In a similar fashion if the discovery and development costs of sub-surface resources are treated as capital formation the

formation. This is largely due to the inability to closely relate the operational definition of net capital formation with the conceptual.

Capital consumption

76. The problem of defining consumption of fixed capital is complicated by the general acceptance of accounting measures for depreciation allowances of business establishments and by the widespread lack of capital accounting for general government, households and private non-profit institutions. In addition, the problem of measuring fixed capital consumption in accord with the economic concept of maintaining capital intact has not been satisfactorily solved in the sense that the economic concept has been translated into a readily measurable definition. In view of these factors it is proposed that two conceptually different measures of capital consumption be used.

The accounting concept

77. The first concept is essentially an accounting measure and is defined as the actual accounting allowances charged against income by public and private enterprises for depreciation, depletion and extraordinary obsolescence of fixed capital plus the insurance claims for accidental damage. By limiting this measure to the capital consumption allowances made by enterprises for taxation and other purposes the system of accounts can more nearly reflect the results of business decisions in the allocation of income between retained earnings and reserves. In addition it provides for a realistic measure of the sources of finance for capital formation. In omitting from the measure the capital consumption for general government, households and private non-profit institutions which generally do not prepare capital accounts, the difficult problem of estimating capital consumption, especially on a basis symmetrical with that for enterprises is avoided. Certain assets, such as dwellings, though legally owned by households, are for purposes of classification treated as enterprises. Since in the absence of capital accounts the estimation of depreciation for such assets is difficult it is recommended that no depreciation allowances for these assets be included in this measure.

78. The general acceptance of financial measures implied in the adoption of the expenditure approach for the measurement of capital formation, and the use of systematic national accounts has lent emphasis to the treatment of capital

shown in a supplementary table rather than being incorporated in the general system of accounts.

The economic concept

86. Capital consumption as an economic concept may be broadly defined as the decrease in value at current prices of durable physical assets. Alternatively it is often taken to represent the present cost of replacing the current loss in economic worth from wear and tear and obsolescence of physical capital. Estimation of this concept is difficult, not only because of a general lack of adequate information, but also because the economic concept is not readily translatable into a unique definition for measurement purposes. Two different concepts are noted in paragraph 89.

87. In the main the measure of economic capital consumption differs from the accounting concept in that it can be defined to include not only the consumption of fixed capital of enterprises but also that of general government and private non-profit institutions. In addition it is measured in terms of current prices of the period rather than in terms of the prices in effect when the assets were originally acquired.

88. In order to derive estimates of net capital formation or net national product it is necessary to deduct the value of the fixed capital consumed from the estimates in gross terms. This procedure is necessary since it is generally not feasible to estimate net capital formation or net national product directly. Accordingly the meaning to be attached to the net concepts depends on the concept of capital consumption used.

89. A major purpose of preparing estimates of capital formation or national product on a net basis is for welfare comparisons. Thus we may define net capital formation as that part of the current output of fixed capital which we may consume and still be as well off at the end as at the beginning of the period. It seems reasonable in this context to define "being as well off" as maintaining the same productive potential of the stock capital at the end of the period as at the beginning. The maintenance of productive capacity, however, may and usually will differ from "maintaining real capital intact" if by this is meant the accumulation of funds for the replacement of the existing physical assets with similar assets. Several factors act to produce this difference, the most important of which are changes in productivity of capital assets and changes in the demand

amortization of these expenses would be included in capital consumption.

82. Inclusion of insurance claim payments as a measure of accidental damage to fixed capital is based on the treatment of insurance in the income and capital accounts. Charges to current account (premiums) for insurance cover factor costs, additions to reserves and claim payments of insurance companies. Only claim payments for the destruction of real assets are included in capital consumption as measuring the loss from accidental damage. Other types of claims such as payment on fidelity bonds which do not represent physical capital loss are regarded as transfers. Business losses in excess of insurance payments are considered as capital losses and excluded from the system of accounts. Insurance payments for accidental damage to stocks should be excluded from capital consumption to the extent that the net change in stocks included in capital formation reflects these losses. It should be recognized that this treatment results in measuring gross capital formation net of such asset losses though enterprises may have sustained no such financial loss.

83. An alternative treatment for accidental damage to fixed capital is to measure this form of capital consumption by the current premiums received by insurance companies less their current operating expenses including, in the case of stock companies, dividends to stockholders. Accidental damage would thus be measured as the sum of claims paid plus any net additions to reserves made during the period.

84. Frequently enterprises with many widely scattered properties do not carry casualty insurance on their buildings and equipment. In some cases reserves are maintained by periodic charges to income and charged with accidental losses to property. Additions to such reserves should be treated as profits and losses charged against them as capital consumption. Such losses are then deducted from profits in the period they occur.

85. For the reasons noted it is recommended that, if available, the accounting allowances for capital consumption be used in the system of national accounts, both as the balancing item between national income and gross national product or expenditure and as a credit item in the consolidated capital account. It is further recommended that a different definition of capital consumption, one that approximates the economic concept, as explained below, be used to derive estimates of net capital formation. It is suggested that estimates on the latter basis be

consumption based on economic considerations will involve the use of rough approximations, as for example that capital consumption approximates some constant function of current output. Other types of estimates appear to require information generally lacking at present such as the age composition of the stock of capital assets and a knowledge of the average economic life of different physical assets.

95. While it has been recommended that the accounting definition of capital consumption be used in connection with an integrated system of national accounts it is recognized that estimates on that basis are frequently lacking especially for countries in which the commodity-flow method is used to estimate capital formation and other aggregates. In such cases it is recommended that attention be given and work instituted on the problem of estimating capital consumption in terms of the economic concept.

96. Where that is done careful attention should be paid to the distinction between capital formation and expenditures for alterations and repairs. This is particularly important for such major physical assets of general government as roads, harbors, canals, etc. While regular maintenance which merely maintains the usefulness of the asset is a current expense such repairs are frequently coupled with improvements such as widening of roads or the deepening of harbors. One fairly satisfactory method is to include all such expenditures and to deduct from them estimates of the normal maintenance expenditures which would merely preserve the asset.

97. Estimates of accidental damage for use in measuring economic capital consumption should include all damage to physical capital assets for which an actuarial basis for estimating probable loss exists whether the assets are insured or not. However damage from unpredictable catastrophes such as major earthquakes or wars should probably be omitted as tending to distort a series on net capital formation derived from the estimates of capital consumption.

V. CLASSIFICATION OF CAPITAL FORMATION

98. It is proposed that gross domestic capital formation be classified according to structure, type of capital formation and by industrial use of capital goods.

for such physical assets.

90. Two additional concepts are, first, maintaining the purchasing power of the money capital and, second, maintaining the capital in the sense of insuring that capital earns its value in alternative uses. In the case of working capital (stocks) the alternative is the current market price of the stocks. For fixed assets the problem is different. For the individual enterprise this is equivalent to the sale value of the going concern but for the economy as a whole fixed capital has no effective alternative use. From this point of view the alternative cost criterion breaks down and we are left with the other concepts noted.

91. If we disregard the concepts of maintaining the money or purchasing power of the money capital there remain the concepts of the maintenance of productive capacity or of the real physical assets. The former concept is especially difficult to define. From the point of view of the economy as a whole we are concerned with total capacity rather than that of an industry or enterprise. Additional capacity in the steel industry is, in this view, substitutable in some ratio for a decline in railroad capacity, to take an example.

92. The problem of maintaining the real physical asset structure involves valuation decisions which will, in reality, not likely be faced. Seldom are very long-lived assets replaced by essentially similar assets either in the same enterprise or in the whole economy. There appears to be a greater likelihood of actual physical replacement if the types of assets dealt with have a relatively short economic life.

93. The concepts noted so far have been defined in terms of the meaning to be attached to net capital formation derived as the difference between gross capital formation and capital consumption. Another approach is to define capital consumption directly without reference to its significance for the net concept. On this basis the measurement of capital consumption is approached as a part of the whole valuation problem, which is that of measuring all transactions in prices of the same time dimension. This approach merely concentrates attention on defining the transaction involved in the consumption of fixed capital rather than on the determination of the current costs of physical replacement or on the determination of productive capacity.

94. In practice it would appear that the preparation of estimates of capital

101. The value of the <u>change in stocks</u> represents the value of the physical change in raw materials, work in progress (other than the work in progress of construction industries and plantations which are included in fixed capital formation) and finished goods which are in the hands of private and government enterprises. Changes in farm stocks such as grain and livestock are included in this flow, while increases in crops, forests, etc., due to natural elements are excluded. Changes in stocks in the hands of marketing authorities and in government stocks of strategic materials and agricultural surpluses are included in this component.

<u>Types of capital goods</u>

102. Table 2 shows the proposed classification of gross domestic capital formation by types of capital goods. It is based on a distinction between a small number of broad categories. Within this framework countries may wish to compile more detailed subdivisions in accordance with their own needs, the characteristics of their economies, and the nature of the basic statistics available.

Table 2. <u>Types of capital goods</u>

1. Fixed capital formation
   a. Dwellings
   b. Non-residential buildings
   c. Construction and works
   d. Transportation equipment
   e. Machinery and other equipment
2. Changes in stocks
   a. Raw materials
   b. Work in progress
   c. Finished goods held for sale

Gross domestic capital formation

103. <u>Dwellings</u>. This item represents all expenditure on new construction and major alterations to residential buildings including the value of the change in work in progress. The value of the land before improvement is included only if used asset transfers are taken into account. The expenditure covers all costs of making the dwellings habitable and includes the cost of external and internal

Structure of capital formation

99. This classification distinguishes between fixed capital formation and changes in stocks. For private non-profit institutions and general government only fixed capital formation is shown. It is further proposed that fixed capital be distinguished between buildings and machinery as well as by form of ownership.

Table 1. Structure of capital formation

1. Fixed capital formation
    a. Private enterprises and non-profit institutions
        (1) Machinery and equipment
        (2) Building and other structures
    b. Government enterprises
        (1) Machinery and equipment
        (2) Buildings and other structures
    c. General government
        (1) Buildings and other structures
        (2) Other
2. Changes in stocks
    a. Private enterprises
    b. Government enterprises

Gross domestic capital formation

100. Gross fixed capital formation represents expenditures for new and used buildings, structures, plant, machinery and other equipment. Since the ownership of dwellings is treated as a business enterprise, the value of all residential construction is included, irrespective of whether the dwellings are owner-occupied or not. It also includes the value of work in progress of the building and heavy construction industries, such as shipbuilding, and the costs incurred during the period for the development of coffee and rubber plantations, orchards, vineyards, etc. Changes in the work in progress of other durable goods which have a comparatively short production period, together with that part of the change in work in progress of heavy construction industries which is being built for non-residents and has not yet passed from resident to non-resident ownership are included with changes in stocks.

108. Changes in stocks are classified as follows:

(a) Raw materials, defined as all purchased materials and semi-finished goods, supplies and fuel, except when purchased for resale in the same form.

(b) Work in progress, defined as goods which have been partly processed or fabricated in the enterprise but which are not normally sold without further processing. Stocks held by the establishment, but owned by others, are excluded, but the value of work performed on such stocks is included in work in progress.

(c) Finished goods include all products in the form usually held for sale.

Classification by industrial use

109. The classification proposed in Table 3 corresponds closely to the major divisions in the International Standard Industrial Classification of All Economic Activities. Manufacturing and construction have been grouped together because of the statistical difficulties usually encountered in measuring separately capital expenditure in these two industries. Category (g) includes also all residential building. The industrial classification proposed for changes in stocks is limited to agriculture, manufacturing, mining and construction, and trade. It is assumed that stock changes in other industries are small and may be neglected.

Table 3. Industrial use of capital goods

1. Fixed capital formation in
   - a. Agriculture, forestry and fishing
   - b. Mining and quarrying
   - c. Manufacturing and construction
   - d. Electricity, gas and water
   - e. Transportation, storage and communications
   - f. Wholesale and retail trade
   - g. Banking, insurance and real estate
   - h. Services
   - i. General government
2. Change in stocks in
   - a. Agriculture, forestry and fishing
     - (i) livestock
     - (ii) other

painting and permanent fixtures such as blinds, stoves, central heating and washing facilities. The item includes residential buildings not operated on a purely transient basis. Hotels, auto courts, and resort dwellings are excluded from dwellings and included as non-residential buildings.

104. Non-residential buildings. This category comprises all buildings other than dwellings, which are constructed for civilian functions of general government and private and government enterprises. It includes industrial buildings, warehouses, office buildings, stores, restaurants, hotels, farm buildings such as barns, and buildings for religious, educational, recreational and social purposes such as hospitals, etc., plus major alterations and work in progress. Movable equipment which is not an integral part of the structure is not included.

105. Construction and works. Construction and works comprise all expenditure by private and government enterprises and general government on the construction of works such as the permanent ways of railroads, subways and tunnels, marine construction other than shipbuilding, piers and other harbour facilities, car parking facilities, water and sanitation projects, airports, electricity transmission lines, gas mains and pipes, communication systems such as telephone and telegraph lines, etc. Expenditures for irrigation projects, flood control, forest clearance, land reclamation, etc., should also be included.

106. Transportation equipment. This includes expenditures by general government and enterprises on ships, motor cars, trucks and commercial vehicles, aircraft, tractors for road haulage, vehicles used for public transport systems, railway and tramway rolling stock, carts, wagons and the animals used for drawing them. The value of work in progress in the case of heavy equipment, such as ships, is included.

107. Machinery and other equipment. This item covers all capital expenditures by enterprises and general government not included in the above groups. It includes power-generating machinery, agricultural machinery and implements, tractors (other than for road haulage), office machinery, equipment and furniture, metal work machinery, mining construction and other industrial machinery, equipment for private research, instruments used by professional men, durable containers, etc.

(ii) What are the methods used for recording changes in stocks including the practices for charging the withdrawals of inventories to current expenses?

(iii) What are the general practices of business accountants and taxation authorities with respect to depreciation accounting; what means are used to provide an adequate allowance from current earnings for replacement of used capital goods?

(iv) What accounting practices are generally followed with respect to maintenace, repair, renovation, alteration, etc., of buildings and equipment?

(v) Do accounting practices differ substantially as between industries and between firms in the same industry? - and in what major respects?

(e) It is recommended that countries which prepare estimates of capital formation provide detailed descriptions of the methods of estimation used including descriptions of the basic statistical sources.

b. Manufacturing, mining and construction

c. Wholesale trade

d. Retail trade

e. Other trade

Gross domestic capital formation

VI. SUMMARY RECOMMENDATIONS

110. The Statistical Commission, taking note of the concepts and classifications proposed in this report, may wish to adopt the following recommendations.

(a) Countries preparing estimates of capital formation are requested to adopt the concepts and classifications proposed in this report. If countries find that their needs are better served by adopting a somewhat different set of concepts and classifications, it is recommended that the relevant items be published separately together with explanatory notes. Adoption of the terminology of this report or similar terminology is suggested.

(b) Countries which, owing to the absence of sufficient basic statistics, are unable to provide estimates of capital formation in the detail and by the classifications suggested in the report, are requested to follow these concepts as far as possible.

(c) Countries preparing estimates of capital formation on the basis of production and import statistics are requested to also explore the possibilities of preparing estimates derived from the data on the capital expenditures of the enterprises concerned.

(d) It is suggested that all countries presently preparing or planning the preparation of capital formation estimates make an analysis of the practices generally adopted in private and government accounting primarily with respect to the use of expenditures and balance sheet data for the purpose of measuring capital formation. Presumably the following questions would be included in such a study:

(i) What criteria are used by enterprises to distinguish between expenditures on current and capital account?