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NON-MARKET GOODS AND SERVICES IN CONSUMER PRICE INDEXES

Paper submitted by the ECE secretariat ¹

I. INTRODUCTION AND SUMMARY

1. This paper is concerned with the treatment of non-market goods and services in consumer price indexes, or CPIs. These are defined here as individual goods and services which are actually consumed by individual households and from which they derive utility but which they either do not purchase or purchase at reduced prices determined by governments on social or political grounds. There are two different kinds of non-market goods and services. The first consists of goods and services that households produce for themselves, mainly agricultural goods and housing services, for which prices have to be imputed when they are included in household consumption expenditures. The second consists of social transfers in kind, as they are now described in national accounts. These are mainly services such as education, health or housing which are provided to households by governments or non-profit institutions either free or at reduced prices. (When provided at reduced prices, the social transfer consists of that part of their value which is not paid for by the household.)

2. The main issue addressed in this paper is whether or not the actual or imputed prices of non-market goods and services should be included in CPIs. One general conclusion reached is that when the prices are imputed because no purchases take place, the prices should not be included in a price index

¹ Prepared by Mr. Peter Hill, Regional Adviser, ECE Statistical Division

whether it is supposed to measure consumer inflation or changes in the cost of living. This conclusion is at variance with the practice of those countries which include the imputed rents on owner occupied housing in their CPI. On the other hand, it is argued that the reduced prices associated with social transfers in kind should always be included. The fact that they are not determined by market forces does not justify omitting them from a price index, even one designed to measure inflation.

3. The background to this paper is the EU Council Regulation on the convergence of inflation which requires inflation in different EU countries to be measured by means of comparable consumer price indexes. Different countries tend to treat non-market goods and services in different ways and the first draft of this paper was written as a contribution to the Eurostat programme to develop harmonised CPIs. ¹ A number of more general issues have also to be addressed in order to be able to decide on the appropriate treatment of non-market goods and services.

4. The stated purpose of the harmonised CPIs is to have comparable measures of inflation. This immediately raises the question of whether there is any difference between a price index designed to measure inflation and one designed to measure changes in the cost of living, as many CPIs are supposed to measure the latter, at least in principle. This question is examined in some detail in an accompanying paper whose conclusions are recapitulated in the first part of this present paper. Inflation indexes are interpreted here as price indexes that measure the change in the 'price level' of a specified set of goods and services by means of the change in their total value. The conclusion is reached that a good measure of inflation should not deviate much from a cost of living index (apart from the effects on the latter of the enlargement of consumers' choice as a result of the introduction of new kinds of goods). When an index of consumer inflation diverges significantly from the corresponding cost of living index it does so because the set of goods and services chosen is not representative of consumption over the entire period of time covered by the index. Indexes which provide 'biased' estimates of changes in the cost of living also provide poor measures of inflation.

5. National accounts contain several different concepts of consumption. The standard definition of household final consumption expenditures in the 1993 SNA and 1995 ESA includes many imputed expenditures for which the prices are also imputed, i.e., hypothetical. It is argued in the paper that these imputed prices contribute no information about the rate of inflation in the economy and should always be excluded from an index designed to **measure** inflation. Similarly, they should be excluded from a cost of living index but on somewhat different grounds because a cost-of-living index that includes imputed expenditures and imputed prices is not appropriate for index linking or compensating individuals against inflation.

6. The most comprehensive and objective measure of consumer inflation is provided by a price index based on the entire set of goods and services purchased by households in **monetary transactions** as defined in the SNA and ESA. Provided the set is representative of purchases in both the periods covered by the index, which implies continually updating the set -- in effect, annual chaining -- the index may also be expected to provide a good

approximation to a comprehensive and objective measure of changes in the cost of living.

7. Household monetary expenditures include their expenditures on non-market goods and services sold by governments or non-profit institutions at reduced prices. As these are prices actually paid by households in monetary transactions they must be included in a measure of consumer inflation even though they may be subject to influences which are not connected with the general rate of inflation. In any case, market prices are not independent of non-market prices. When the reductions in price are achieved by reimbursing households for part of the expenditures they incur on purchasing items such as medicines or doctors' services at their full market prices, only the part not reimbursed should be included in the CPI as this is the price actually paid by the household. When a charge is introduced for a good or services previously provided free by a government or non-profit institution, the increase from a zero to a positive price must also be included in the index.

II. THE MEANING AND MEASUREMENT OF INFLATION

8. There seems to be little discussion of the exact meaning of inflation in economic literature. A typical definition runs as follows: "The inflation rate is the percentage rate of increase of the level of prices during a given period."² Another widely quoted definition of inflation is that "inflation is a process of continuously rising prices, or equivalently, of a continuously falling value of money."³ Defining inflation as the rate of change in the general price level suggests measuring it by a price index that measures the change in the monetary value of a specified fixed basket of goods and services. The meaning of such an index is very clear and the two most widely used price indexes, the Laspeyres and Paasche indexes, are defined in this way. It has long been recognised that many different kinds of baskets of goods and services might be chosen, depending on the interest or needs of the analysts or policy makers who use the indexes. There are as many "levels of prices" as there are economically relevant baskets of goods and services. There is no escaping the 'index number problem'.

9. Economic theory has traditionally taken a different approach to the definition of a price index in which the concept of the price level does not figure explicitly. A consumer price index is equated with a cost of living, or COL, index which can be loosely interpreted as measuring the minimum change in expenditure that would be needed to permit the consumer to attain the same level of utility as in the base year, assuming no change in tastes. A COL index is influenced by the substitutions that consumers make in response to changes in relative prices, as well as by the change in general price level. A COL index therefore measures the difference in value two baskets of goods and services which are **different** even though they provide the same level of utility to the consumer. This raises the question whether a COL index necessarily provides a good measure of inflation.

10. The relationships between COL indexes and fixed weight indexes are well known. Assuming that changes in relative quantities and relative prices are negatively correlated, as tends to happen when consumers are price takers, the Laspeyres price index will tend to be greater than the associated COL index, while the Paasche will tend to be less. Increasing a consumer's income

in proportion to the Laspeyres price index will overcompensate for the increase in the cost of living. It follows from the definition of the Laspeyres index that, if the consumer's income is increased by this amount, the consumer has the purchasing power to buy the same basket of goods and services as in the first period, but by substituting at the margin goods and services which have become relatively cheaper for ones that have become relatively dearer the consumer must be able to attain a higher level of utility. A somewhat smaller increase in income would be sufficient to keep the consumer on the same utility level so that the Laspeyres must be greater than the COL index.

11. The upward 'bias' in the Laspeyres index compared with the COL index has received a lot of attention recently because many consumer price indexes are Laspeyres type indexes in practice so that index linking to such indexes tends to overcompensate for changes in the cost of living. However, fixed weight indexes are not inherently biased compared with COL indexes. The extent of any bias depends on the weights used. Serious bias is symptomatic of the use of inappropriate and uncharacteristic weights -- typically obsolete weights.

12. As the COL index tends to lie between the Laspeyres and the Paasche indexes there should be some basket of goods and services between the Laspeyres and Paasche baskets whose change in value would be identical with the COL index. It is easy to find such a basket by taking an appropriate combination of the quantities consumed in the two periods being compared. Notwithstanding the fact that the COL index is defined as the ratio of the values of two different baskets, there exists a price index of equal value that measures the change in the value of a **single**, fixed basket. A COL index may therefore be interpreted as being equivalent to a price index that utilises a basket of goods and services that is a kind of average of the patterns of consumption both periods.⁴ As such a basket is characteristic of consumption over the entire span of time covered by the index, a COL can be interpreted as providing a good measure of inflation and not just of the change in the cost of living.

13. The bias in conventional Laspeyres or Paasche indexes arises from the fact that they use weights which are biased in favour of one of the periods to the complete exclusion of the other. Practical considerations, including cost and timeliness, may dictate the use of the weights of one single period, and even the repeated use of the same period as a base period. Biases in the indexes are attributable to these practical considerations.

14. One way to reduce bias in inflation indexes is to construct chain indexes in which the weights are updated every year. Chaining will usually tend to reduce the gap between the Laspeyres and Paasche indexes, possibly quite considerably, as compared with indexes which attempt to make a direct comparison between two periods that are far apart. Each link in the chain index uses a basket of goods and services that must be fairly characteristic of both years given that patterns of consumption do not have time to change much between consecutive years.

15. Another way to reduce bias is to use a Fisher index instead of a Laspeyres or Paasche index. The Fisher is a superlative index that may be

expected to provide a close approximation to the COL index in most circumstances. Like the equivalent fixed weight referred to above, the Fisher utilises the quantity weights of both the periods, but it can actually be calculated in practice. The best solution, in principle, is to use a chain Fisher index.

Enlarging the set of consumption possibilities

16. There is one major qualification to the equivalence between inflation and changes in the cost of living. When the set of goods and services available to consumers is enlarged as result of the introduction of major new kinds of goods and services that provide utility to consumers in new ways, the consumer's standard of living is increased. The introduction of a new good exerts a downward influence on the cost of living independently of what is happening to the prices of goods and services available in both the periods being compared.

17. On the other hand, if inflation is interpreted as a phenomenon in which prices are rising over time, the goods and services in question have to be on the market in both periods in order to observe that their prices have actually changed. **Measures** of inflation need to be confined to goods and services for which prices can be observed in both periods. The mere appearance of a new kind of good on the market does not in itself reduce inflation, even though it may reduce the cost of living if consumers choose to buy some of it.

18. In principle, therefore, an inflation index and a COL index may diverge because of the impact of the introduction of new kinds of goods and services. As policy objective, therefore, compensating for increases in the cost of living is not quite the same as compensating for inflation, at least over the long term when the introduction of new kinds of goods and services as a result of technical progress may have a significant impact on the standard of living and the cost of living. If the policy objective is actually to measure inflation, a COL index may have a downward bias because of new goods.

Inflation as distinct from inflationary pressure

19. Inflation itself must be clearly distinguished from the circumstances or conditions which generate inflation. The purpose of an inflation index is to measure the actual percentage rate of increase in the price level and not the conditions or factors responsible for the inflation. In physics, the distinction between an increase in temperature and the forces which cause temperature to rise is obvious. For example, friction or an increase in the pressure of a gas causes temperature to rise, but the friction and the increase in pressure are very different from the increase in temperature. Measuring inflation is the economic equivalent of measuring temperature change in physics. An inflation index is not a gauge of inflationary pressure.

20. One of the main concerns of this paper is the treatment of non-market goods and services whose prices are subject to government control or fixed administratively by governments or non-profit institutions serving households (NPISHs). For example, governments or NPISHs may provide health, education

or housing services to households at prices which bear little relation to their costs of production. The prices of these non-market goods or services do not respond to the market forces of supply and demand in the same way as ordinary market goods and services so that their price movements may be very different from those of the latter. However, if they fall within the set of goods and services covered by the index, their price movements must be included in the index, even though they may not be indicative of the general rate of inflation.

21. Once the set of goods and services covered by an index is defined, every price increase within the set ipso facto raises the price level for the set and therefore contributes to inflation, whatever the factors responsible for the price increase. An inflation index which excluded non-market goods and services, or gave them less weight, would not measure of the amount of inflation which has actually occurred. In any case, movements in market and non-market prices are not independent of each other. Holding down some prices by government control or intervention may not reduce inflation for the economy as a whole but simply change the pattern of inflation.

22. Choosing to give less, or no, weight to increases in non-market prices would be equivalent to trying to construct some kind of 'indicator' of underlying inflationary tendencies. 'Indicators' are widely used in business cycle analysis but they are designed to supplement, and not replace, actual indices of industrial production. A single index cannot measure two different things, such as actual inflation and inflationary pressure, at the same time. The same rate of inflation may be consistent with different inflationary situations or tendencies. For example, a given increase in the price level for final domestic expenditures might be attributable either to increases in domestic costs and prices or to increases in import prices. The first situation might be judged to be more inflationary than the second even though the rate of inflation is the same.

23. Users may wish to distinguish increases in non-market prices from increases in market prices for analytic or policy purposes but this need is met by ensuring that overall indices can be decomposed to permit this. It does not justify trying to anticipate users' needs by excluding certain kinds of price increases altogether on the grounds that they are considered a priori to be unrepresentative of general inflationary tendencies.

III. INFLATION AS A MONETARY PHENOMENON

Monetary transactions

24. Inflation occurs when prices, denominated in terms of national currency units, are rising. Such prices can be only observed in monetary transactions.

25. It is not possible to define a monetary transaction simply as one in which 'money' changes hands between two economic units. Because of advances in technology and financial innovations, payment in cash is becoming less frequent in some countries, being replaced by payment by cheque, credit card or other form of credit. In effect, payment is made initially by the

creation of a short term financial claim by the seller over the buyer, which the seller expects to be repaid quickly by means of a transferable deposit when the cheque or credit charge is cleared. Whatever the exact mechanism by which the payment is eventually made, the financial claim is denominated in terms of currency so that a monetary price is established when the good or service is purchased.

26. A monetary transaction may therefore be defined as one in which the counterpart to the exchange of a good or the provision of a service is **either** the payment of currency by one party to the other **or** the establishment of a new short-term financial claim denominated in terms of currency by one party over the other. Either way, a price is specified in terms of currency units.

27. Monetary transactions generate a demand for cash or close substitutes for it provided by banks or other financial institutions. In both business and national accounts, double entry book keeping requires each party to a monetary transaction to record it twice : once in an account for goods and services, such as a production or consumption account, with a second counterpart entry in the financial account of each of the parties concerned.

Non-monetary transactions

28. Many transactions involving flows of goods and services are not monetary and do not create a demand for money or other financial assets. For example, in barter transactions which can be broadly interpreted to include payments in kind, goods or services are exchanged directly for each other without a monetary price being observable. Although they are non-monetary transactions, barter transactions are nevertheless market transactions.⁵ They may become increasingly important under conditions of high inflation.

29. Another important category of non-monetary transactions consists of transfers in kind in which goods or services are provided from one economic unit to another without any counterpart, including social transfers in kind in which governments or NPISHs provide goods or services to individual households without any charge.

30. In the SNA and ESA, hypothetical non-monetary transactions are deemed to take place within a single economic unit in order to be able to record the consumption of goods and services produced within the same household, such as agricultural goods consumed by their producers or housing services consumed by owner-occupiers. A transaction is assumed to take place whereby the household as producer transfers to itself in its capacity as a consumer goods or services it has produced itself.

31. Thus, the accounts of the SNA and ESA have to include many non-monetary transactions in order to be able to record the associated real flows of goods and services. However, this does not justify automatically including them within the scope of an inflation index.

IV. A SYSTEM OR HIERARCHY OF INFLATION INDICES

32 Different inflation indices may be defined in relation to different kinds of goods and services, depending on the different needs and objectives of users. The national accounts provide a useful framework within which a set of interrelated price indices may be defined. The main final expenditure aggregates of the SNA and ESA are as follows:

- (a) households' final consumption expenditures,
- (b) NPISHs' final consumption expenditures,
- (c) government final consumption expenditures,
- (d) gross capital formation,
- (e) exports,
- (f) imports.

Separate price indices can be compiled for each of these flows and also for further aggregates built up from them. One possible hierarchy is as follows :

households' final consumption expenditures (a)
total final consumption expenditures (a+b+c)
total domestic final expenditures (a+b+c+d),
total final expenditures (a+b+c+d+e),
GDP (a+b+c+d+e-f).

If rates of inflation are to be compared between different countries, a case can be made for using a price index based on any of the above final expenditure aggregates. In the 1993 SNA, the price index for total domestic final expenditures is recommended as the most suitable comprehensive multi-purpose measure of inflation (see paras. 12.75 and 16.158).

A consumer price index, or CPI, as an inflation index

33 From a national accounts perspective, a CPI is a price index relating to household final consumption expenditures. The most comprehensive and objective index of consumer inflation is a price index that measures the change in the monetary value of the entire set of consumption goods and services purchased by households in monetary transactions.

34 Three elements are involved in this definition.

- (1) The goods and services must be **individual** consumption goods and services, as defined in the SNA and ESA, which are "used for the direct satisfaction of individual needs and wants" (ESA para. 3.75).
- (2) The expenditures must be **incurred by households** and not by other units such as governments or NPISHs.
- (3) The expenditures must be incurred in **monetary transactions**.

35 The coverage of a comprehensive inflation index of this kind is nevertheless much narrower than that of the national accounts price deflator for total household final consumption expenditures because of the many imputed expenditures on goods and services acquired in non-monetary transactions.

36 In practice, a CPI is liable to be used by default as a general index of inflation because of its familiarity, frequency, reliability and timeliness. The use of a CPI in this way as proxy or substitute for a more general measure of inflation tends to create pressure to broaden its coverage to include additional items that are not part of household consumption expenditures. This pressure has been resisted if CPI is not to degenerate into a vague ad hoc short term price index without any clear meaning, coverage or purpose.

V. MARKET AND NON-MARKET GOODS AND SERVICES

37 As already mentioned, two quite different types of non-market goods and services consumed by households are distinguished in the SNA and ESA.

(1) The first type consists of goods and services that are consumed by the same units that produce them. They are recorded in national accounts because they are real goods and services whose production uses up resources and whose consumption by households provides welfare or utility. Whereas all such goods should, in principle, be recorded, at least in the SNA, by convention the only services recorded are the housing services produced by owner-occupiers and domestic services produced by employing paid domestic staff.

(2) The second type of non-market goods and services are those provided to households as social transfers in kind. They consist typically of education, health, housing or transport services provided by governments or NPISHs to individual households. Collective services provided to the community as a whole, such as public administration or defence, are not included. Social transfers in kind are financed by government units or NPISHs wholly or partly out of their general incomes -- taxes, social security contributions or other current transfers, or property incomes. The goods and services may be provided completely free of charge or sold at reduced prices that are described as "not economically significant".

38 Many goods or services provided as social transfers in kind are produced as the outputs of non-market producers owned and operated by governments or NPISHs : e.g., government owned hospitals or schools. Others, however, may have been purchased (at market prices) from market producers by governments or NPISHs and then provided to households.

VI. OWNER OCCUPIED HOUSING AND OTHER GOODS AND SERVICES PRODUCED FOR OWN FINAL CONSUMPTION

39 At a world level, the main items produced by households for their own consumption are likely to be agricultural goods, foodstuffs and clothing, and also the housing services produced by owner occupiers. Whereas the former do not appear to be usually covered by CPIs there is a long tradition of trying to include the latter. Because the treatment of owner occupied housing is controversial, it is worth examining it in some detail.

40 The current (1993 SNA and 1995 ESA) treatment of owner occupied housing in national accounts may be summarised as follows. The owner of the house is treated as being the proprietor of an enterprise that uses the house as a

fixed (capital) asset to produce housing services. This is treated as a genuine process of production which will normally require some inputs such as routine repairs and maintenance. The use of the house is treated as consumption of fixed capital (i.e., depreciation). The housing services produced as output are then recorded as being consumed by the household. Their **imputed** value forms part of households' consumption **expenditures**.

41 In the SNA and ESA, gross fixed capital formation can be undertaken only by enterprises. As an owner occupier is regarded as the owner of an enterprise, the purchase of the house counts as gross fixed capital formation. However, households in their capacity as consuming units cannot engage in gross fixed capital formation, so that consumer durables have to be classified as consumption goods and not fixed assets.

42 The rationale for recording production for own consumption in national accounts is clear. The **activities** themselves are **not imputed**. They are genuine processes of production and consumption that take place in the real world. They use up resources and affect households' welfare and standard of living. However, as the outputs are consumed directly within households, they never get onto the market. They are not bought and sold and have no prices of their own. In order to be able to record them in the accounts **prices** have therefore to be **imputed** for them. The imputed monetary values of the outputs are recorded even though households neither receive money for producing them nor spend money on consuming them. Having recorded the outputs in monetary terms the accounts are then obliged to go on to record some imputed incomes arising out of these activities and also imputed expenditures out of these imputed incomes. In this way, owner occupied housing finally finishes up as a component of consumers' expenditures in national accounts.

43 There is thus an asymmetry between the prices and quantities because the quantities are real whereas the prices are imputed. As the imputed values have to be aggregated with actual market values, the imputed prices have to be current market prices. Valuation at market prices is therefore recommended in the SNA and ESA although valuing by costs of production is accepted as a second best procedure when market prices are not available. (In the SNA and ESA, however, capital costs in the form of interest charges are not treated as production costs.)

44 In the case of the housing services, the relevant market prices are the estimated rents that would be charged for similar rented accommodation. When there is not enough rented accommodation of the same type and quality on the market for reliable estimates to be made, the second best solution could be tried, but it may not be very satisfactory in practice because of the difficulty of estimating consumption of fixed capital on the house and the exclusion of interest charges..

45 The justification for recording the actual quantities of goods and services produced for own final consumption in national accounts may be fairly clear but the justification for recording the associated imputed prices in a consumer price index designed to measure inflation is by no means obvious. The kinds of questions to be asked of goods or service produced for own consumption in the context of an inflation index are: what effect do they

have on the general price level? what contribution do they make to inflation? what information do they supply that can be used to **measure** inflation?

46 Consider the simple example of jam which may be either purchased on the market or produced within the household for own consumption. The contribution of jam to the measurement of consumer inflation is made by observing and recording changes in the price paid for it by households when purchasing them in monetary transactions. These price changes can be recorded on their own **independently** of all other prices . They provide the elementary bits of information from which a price index can be constructed.

47 On the other hand, observing the consumption of goods and services such as jam produced within the household provides no information of this kind as there are only **quantities** to be observed . There are no monetary transactions, nor indeed transactions of any kind, and there are no prices. Recording the consumption of jam produced for own use within households tells us something about household activities and welfare but nothing about inflation.

48 As already noted, national accounts have to impute a price in order to be able to estimate the market value of the jam produced and consumed within households. Valuing at market prices is equivalent to valuing at the opportunity cost of consuming the jam rather than selling it. It follows that the imputed prices in national accounts increase at the same rate as the corresponding market prices recorded in monetary transactions. But the increase in the opportunity cost of consuming home produced jam is a **consequence** of inflation and not a component of inflation. The increase in the market price of jam must be measured and known in advance in order to be able to calculate the increases in the opportunity cost of consuming it. Increases in opportunity costs tell us something about the impact of inflation on the consumption of own produce but they do not provide any new information about inflation.

49 Although jam has been used as a simple example, the conclusions reached apply to all kinds of consumption of own production. Imputed prices, including the imputed rents for owner occupied housing, are hypothetical prices which have no place in a price index intended to **measure** inflation. They are a function of inflation and not a component of inflation. In contrast to any good or service bought and sold on the market, each of which has its own monetary price, observing a good or service produced for own consumption in isolation from all other goods and services provides no information about inflation.

Owner occupied housing in cost of living indexes

50 While imputed prices should not be included in a price index intended to measure inflation, it may be argued that they should be included in an index intended to measure changes in the cost of living of households. If imputed rents rise for owner occupiers, for example, the opportunity costs of consuming their own housing services must rise as just noted, and this appears to increase their cost of living. On the other hand, home owners produce as well as consume housing services so that any increase in the imputed rents they pay is counterbalanced by an equal increase in the imputed

rents they **receive**. Home owners are not worse off as a result of an increase in the imputed rents, so that it is not clear in what sense their cost of living has increased. In the case of imputed expenditures, it is economically unrealistic and theoretically unsatisfactory not to recognise that there are always additional resources to accompany increased expenditures.

51 The national accounts show the whole picture. They start by recording the imputed value of the outputs of goods and services produced for own consumption by households and the imputed value of the household income generated by this production and finish by showing the imputed expenditures on their consumption. They highlight the fact that imputed output, imputed income and imputed consumption are all **interdependent** in the case of goods and services produced for own final consumption. Imputed expenditures on consumption cannot be recorded without also recording imputed receipts from the sale of output of equal value. Increases in the imputed prices of the goods or services produced for own consumption increase a household's receipts as much as its expenditures.

52 Consider the limiting case of household living in its own dwelling which is also completely self sufficient with respect to food, clothing, fuel, etc. and does not make any monetary purchases on the market. The increase in its cost of living could be calculated on the basis of the imputed prices or opportunity costs of all the various items consumed by the household. It would be the same as the increase for a household which purchased the same basket of goods and services on the market. However, whereas the latter household needs additional money income to maintain its standard of living, the self sufficient household does not. Common sense shows that a completely self sufficient household is effectively insulated from inflation. Much more importantly, similar considerations apply when only part of a household's expenditures are imputed. A household does not require compensation for increases in the imputed prices of those goods and services it produces itself.

53 The classic definition of a cost of living index is that it is "the ratio of the minimum expenditures required to attain a particular indifference curve under two price regimes".⁶ When the resources out of which the expenditures are incurred are **independent** of the expenditures, any change in the monetary value of the required expenditures requires a corresponding adjustment in the consumer's resources to enable the consumer to stay on the same indifference curve. This justifies describing the ratio as a **cost of living** index. However, when goods and services are produced for own consumption, the resources and the expenditures are jointly determined and no further adjustment is required.

54 A 'cost-of-living' index could, of course, be defined that includes imputed expenditures and imputed prices. However, as a household does not require compensation for increases in its imputed expenditures, it would not be appropriate to use the resulting index to adjust the monetary expenditures (or income) of the household by such an index. Such an adjustment would either raise or lower the household's standard of living in practice. A priori, there is no reason why the increase in the household's monetary expenditures that is needed to keep it on the same indifference curve should

be equal to the increase in an index that includes the imputed expenditures and prices.

55 Suppose, for example, that all prices remain constant except market rents. Tenants require additional income to maintain their standard of living but homeowners do not. By including imputed rents in an index covering both tenants and homeowners, the resulting index overstates the amount of the additional monetary income needed to keep the community as a whole as well off as before. In effect, including imputed rents gives too much weight to market rents in the overall index. It seems appropriate, therefore, to exclude all imputed expenditures and imputed prices from COL indexes intended to be used for index linking monetary flows or compensating households against inflation. Thus, whether the price index is meant to measure inflation or changes in the cost of living, imputed prices should not be included.

Price indices covering inputs into production for own consumption

56 The previous discussion has focused strictly on the goods and services **consumed** by households, as these are the relevant goods and services for a price index for household consumption. However, by observing the **activity of producing** goods and services for own final consumption, something may be learned about inflation in the economy. The production of housing services by owner occupiers for their own consumption may be a rather nebulous activity, but for other types of own account production the process of production is rather clear. For example, the activity of producing jam or butter can be readily distinguished from the consumption of jam or butter because the production and consumption of goods are quite different activities which take place at different times, and usually also at different places, whereas the production and consumption of services are usually simultaneous, being essentially different facets of the same activity.

57 When own account production requires inputs to be purchased on the market in monetary transactions, changes in the prices paid do provide information about the rate of inflation and also indirectly affect the household's cost of living. In principle, **input** prices ought not to be included in a price index intended to measure the prices of final consumption goods and services. However, it can be argued that the expenditures incurred by households on the inputs are effectively 'final' when the inputs are used solely for the purpose of producing goods and services which the household then uses directly to satisfy its own personal needs or wants. ⁷

58 Conceptually, the coverage of a consumer price index could be extended to measure the increase in the price level of consumption goods and services purchased by households in monetary transactions **and** of other goods and services purchased by households in monetary transactions which are used up entirely in the production of goods and services for their own final consumption. Own labour is likely to be a major input into the production of many goods for own consumption but would not be included in such an index as it is unpaid. On the other hand, purchases of materials such as plants, garden tools, fertilisers, or insecticides to be used by households to produce vegetables, fruit or flowers for own consumption would be included. **In principle**, according to the SNA and ESA, these are intermediate and not final consumption goods, even when purchased by households, and they should

not be included in household consumption expenditures or in CPIs. The expenditures to be included in household final consumption expenditures ought to be the imputed expenditures on the vegetables, fruit and flowers grown by the households and not the actual expenditures on the fertilisers, insecticides, etc. **In practice**, the materials purchased tend to be treated as if they were consumer goods anyway in national accounts and CPIs. This practice is, in effect, a tacit endorsement of the principle being advanced here, namely that purchases of intermediate goods or services that are used by households exclusively to produce other goods and services for final consumption should be treated as if they were themselves final for purposes of CPIs.

59 Applying this principle to the production of housing services by owner occupiers would imply that all monetary expenditures incurred by owner occupiers on goods and services for the repair and maintenance of their dwellings would be included in the CPI, whether these are technically intermediate or final according to the SNA and ESA. No account would be taken, however, of unpaid labour inputs provided by the owner or other members of the household.

60 There remains the problem of how to deal with the consumption of fixed capital on the dwelling, which may be the biggest input into the production of housing services. Consumption of fixed capital is a difficult concept in theory and many statistical offices do not even attempt to estimate it in practice. The concept of the increase in the price of capital consumption is abstruse. A further complication is that, from an economic point of view, it is not appropriate to ignore the interest or capital cost for an activity which is as capital intensive as the production of housing services.

61 To avoid, or side-step, these complications a simpler but more drastic alternative would be to extend the coverage of the index by one further step to include not only purchases of intermediate inputs but also of fixed assets used by households entirely to produce goods and services for their own final consumption : in other words, to extend the scope of the index to include gross fixed capital formation by households. Purchases of dwellings by owner occupiers would then be included. In effect, the extended index would cover all monetary expenditures, whether current or capital, incurred by households for the purpose of satisfying their own personal needs and wants.

62 Purchases of dwellings are typically the largest and most important monetary transactions undertaken by households in their capacity as consumers. Although very large transactions, they would not dominate an index because they are also undertaken very infrequently. Assuming sales of existing dwellings are treated as negative purchases, as in national accounts, purchases and sales of existing dwelling between different households would cancel out, apart from agents' fees and similar charges, and have little effect on the index. In effect, the index for dwellings would be determined by changes in the prices of new dwellings.

63 Finally, it should be remembered that both national accounts and CPIs treat consumer durables as if they were consumption goods even though from an economic point of view they are clearly assets that are used over periods of many years. Treating dwellings in the same way as durables in an inflation

index would not be such a radical innovation, therefore. Conceptually, the main difference between dwellings and consumer durables is that they tend to have longer service lives.

VII. SOCIAL TRANSFERS IN KIND

The distinction between market and non-market prices

64 In the ESA and SNA it is necessary to distinguish the reduced prices paid by households for non-market goods and services from market prices because the reduced prices undervalue the goods or services concerned for aggregation purposes. These prices are described as being "not economically significant". They might also be deemed to be unsuitable for inclusion in an inflation index because they are artificial, administered prices that are not determined by market forces.¹⁰

65 The two following characteristics help distinguish non-market from market prices.

- Non-market prices are only charged by government units or NPISHs. The goods and services may have been previously purchased on the market by a government unit or NPISH or be produced by a non-market enterprise.
- The supply of non-market goods and services must be wholly or partly financed out of funds other than sales receipts as a matter of deliberate policy. When fixing a non-market price, the government unit or NPISH responds to a perceived social need or policy objective and is not seeking to recover its costs.

66 Changes in non-market prices are therefore not determined by market forces although they may be partly influenced by them. For example, non-market prices may be changed because of :

- changes in policy, perhaps resulting from a change in government, or even changes in social and political philosophy about the roles and responsibilities of governments and households;
- changes in the availability of other resources, as reflected by the overall current surpluses or deficits of the governments or NPISHs;
- changes in the demand for the goods and services, perhaps resulting from demographic changes;
- changes in the costs of producing the goods and services.

67 The prices of non-market goods and service may therefore move quite differently from market prices and the question arises of what role they should play in an inflation index.

68 Non-market prices are different from heavily subsidised market prices. Although the prices of heavily subsidised products may be low they are still determined by market forces in the same way as heavily taxed products. The market for a heavily subsidised product may still clear at an equilibrium price. On the other hand, not only is a non-market price fixed by a political decision but also the total quantity is usually constrained by the amount of general funds available. When both the price and the quantity are fixed the market will not clear (except by coincidence) the most likely outcome being excess demand characterised by shortages, queues or rationing.

The valuation of non-market goods and services in national accounts

69 When prices are determined by market forces, the **relative** prices of different goods and services provide a suitable basis for aggregation because they reflect both relative costs of production and relative benefits to users. However, non-market which are either zero or not economically significant are not suitable for aggregation purposes. Ratios of non-market to market prices may reflect neither relative costs nor relative benefits.

70 For consistency, therefore, the SNA and ESA require non-market goods and services to be valued at the market prices provided that these can be estimated reliably. Otherwise, they have to be valued on the basis of their costs of production. In practice, there are usually no appropriate market equivalents for goods and services produced by non-market enterprises owned and operated by governments, such as state schools and hospitals, whose outputs have therefore to be valued at cost.

71 When the goods and services are free they are obviously non-market, but when some price is charged the decision whether to treat it as economically significant or not becomes critical for the national accounts. If the price is deemed to be non-market the output is valued at the full costs of production and the price is ignored. If it is deemed to be market, the output has to be valued at that price, even though it may still be well below the average cost of a unit of output.

72 This poses a difficult problem for national accounts as it is not easy to determine the point at which a price switches from being non-market to market. The ESA recommends that when the prices exceed 50 per cent of production costs they should cease to be treated as non-market, but the SNA leaves compilers some discretion about how to decide which prices are economically significant.

73 In effect, the national accounts reject non-market prices for aggregation purposes. Nevertheless, they remain actual transaction prices which cannot be ignored for purposes of price indexes.

VIII. THE SCOPE OF A CPI AS AN INFLATION INDEX

Consumption expenditures versus actual consumption

74 In the SNA and ESA, two different concepts of consumption are employed: consumption expenditures and actual consumption. The expenditure concept is

the traditional one in national accounts whereas the actual consumption of households is a new extended concept that also includes the value of the social transfers in kind received by households.

75 Expenditures are deemed to be incurred by the units that bear the costs irrespectively of who makes the payment. When households consume goods or services they have produced themselves, they bear the costs themselves. As already explained, they are treated as incurring (imputed) consumption expenditure out of (imputed) income generated by the production. In addition, when employees receive remuneration in kind, they are treated as being paid imputed income by their employers out of which they incur imputed expenditures. The imputed values of goods and services acquired through barter transactions are also included in households' consumption expenditures. Thus, household consumption expenditures include a range of imputed expenditures.

76 On the other hand, household expenditures do not include the values of goods and services received as social transfers in kind as the costs are borne by governments and NPISHS. Expenditures on social transfers in kind are incurred by governments and NPISHS and form part of their final consumption expenditures. When a household purchases a good or service, such as medicine, and is then fully or partly reimbursed by a government unit or NPISH, only the part of the expenditure that is not reimbursed is treated as expenditure by the household, the remaining expenditure being attributed to the government or NPISH.

77 Actual household consumption is obtained by adding the value of the social transfers in kind received by households to their total consumption expenditures. Conversely, the actual consumption of governments and NPISHS is obtained by subtracting the value of the social transfers in kind from their consumption expenditures. Actual household consumption measures the total value, including imputed values, of all the individual goods and services consumed by households whether the costs are borne by themselves, governments or NPISHS. It is a comprehensive measure of the volume of goods and services consumed by households and is therefore suitable for measuring changes in the welfare or standard of living of households. It is also used for purposes of international comparisons of living standards based on PPPs.

A hierarchy of household consumption concepts

78 In practice, there are not just two but a hierarchy of alternative consumption concepts implicit in the SNA and ESA. They may be listed as follows.

(1) Actual household consumption (SNA and ESA)

less the (imputed) value of social transfers in kind received by households

equals (2)households' consumption expenditures (SNA and ESA)

- less the (imputed) value of goods and services produced by households for own final consumption
- less the (imputed) value of goods and services received as remuneration in kind, payments in kind or (non-social) transfers in kind or through barter
- equals (3)households' purchases of consumption goods and services in monetary transactions
- less households' purchases of goods and services at non-market prices
- equals (4)households' purchases of goods and services in monetary transactions at market prices.

The scope of a consumer price index

79 In order to have an objective and comprehensive measure of consumer inflation, the appropriate aggregate is (3) in the above list. This covers all expenditures incurred by households in monetary transactions whether or not the national accounts deem some of the prices to be non-market.

80 It can be argued that an inflation index should be confined to changes in the prices of market goods and services, on the grounds that inflation is a market phenomenon which manifest itself in increases in market determined prices. The counter argument is that every price increase, whether for a market or a non-market good or service, raises the price level and therefore increases the rate of inflation as generally defined and understood in economics. The national accounts distinction between market and non-market prices is not one which households are aware of or which they attach any significance to.

81 An inflation index that discriminated between different kinds of price increase, selecting some and discarding others, would no longer measure the actual rate of inflation. In any case, as market and non-market prices co-exist within the same economic system, the market forces that determine market prices cannot be independent of the non-market prices. If a government freezes some non-market prices, the rate of inflation for the economy as a whole will not necessarily be slowed down as it may simply cause some market prices to rise faster. Government controls or intervention may have much more impact on the pattern of relative prices than on the overall rate of inflation.

82 The harmonisation of consumer price indices between countries does not imply that certain kinds of prices should be excluded on the grounds that they behave differently from most other prices or because they are to be found only in some countries but not others. Once the scope of the expenditures to be covered by the index is defined, the prices of all the goods and services covered must be included, however their prices are determined. The inclusion of non-market prices within CPIs does, however, raise some special problems that need further consideration.

Price indexes including non-market goods and services

83 As already noted, there are two different kinds of situations in which non-market prices may be charged. The first occurs when a non-market enterprise owned by a government or NPISH (state or religious school, state or municipal hospital or clinic, etc.) sells its own output at a price which is not economically significant. Such prices are actual transaction prices that can be incorporated in a CPI in the same way as other prices. The government's expenditure is equal to the costs of producing the output less the amount received from the household (see para. 9.78 of the SNA and para.3.79 of the ESA). The price paid by the government is therefore equal to the unit cost less the price paid by the household.

84 The second situation occurs when a government unit or NPISH purchases a good or service from a market producer or retailer and then resells it to a household at a lower non-market price. In this case, the expenditure is also divided between the household and the government or NPISH. The price to be included in a CPI is the price actually paid by the household to the government unit or NPISH. The price paid by the government or NPISH (to be included in the price index for the consumption expenditure of the government or NPISH) is equal to the difference between the price received by the market producer or retailer and the price paid by the household.

85 A variant of the second case occurs when a household buys a good or services directly from a market producer or retailer and is then wholly or partly reimbursed by a government unit or NPISH. To be consistent with the case just described, the price paid by the household is the amount that is not reimbursed. (The amount that is reimbursed is the appropriate price for the price index for the consumption expenditures of government or NPISHS.)

86 This treatment reflects the underlying economic realities. If a household pays 20 francs for a medicine and gets back 12 francs from government or social security, the price paid by the household to acquire the medicine is, in fact, only 8. Receiving 12 francs as reimbursement is not the same as receiving a free, or uncommitted, cash transfer, because the household must have already have spent 12 francs in order to be entitled to the reimbursement.

87 The SNA and ESA treat this situation as if two transactions took place with the pharmacist, the retail price being split into two components: a non-market price paid by the household and the remainder paid by the government or NPISH directly to the pharmacist and **not** to the household (see para. 4.105 of the 1995 ESA). During the period intervening between the time the household initially purchases the good or service at its full market price and the time reimbursement is received, the household is treated as making a short term loan to the government unit or NPISH which is repaid when the reimbursement subsequently received (see para. 8.102 of the 1993 SNA). As the reimbursement is treated as the repayment of the loan, it is not recorded as a cash transfer and it does not form part of household income (see paras. 8.102 of the 1993 SNA and 4.105 of the 1995 ESA).

88 The full market price initially paid by the household to the retailer, doctor, etc. does not figure explicitly in the SNA and ESA and it should not

be included in a CPI. The part paid by the household belongs in a CPI, while the remaining part belongs in a price index for the consumption expenditures of government or NPISHS. In practice, it may not be easy to partition the prices received by the sellers (the retailers, doctors, etc.) in this way, but the partitioned prices are the prices actually paid by consumers that are relevant for consumer behaviour, welfare and CPIs.

The introduction of charges for free goods or services

89 It is becoming increasingly common for a government or NPISH to introduce a charge for a non-market good or service provided free previously. The price rises from zero to a positive figure and this price increase must be captured by a price index.

90 Such a price increase can be covered by a price index because the prices and quantities are known in both periods, even though one price happens to be zero. The good or service can therefore easily be included a Laspeyres or Paasche index. For example, it can be seen by inspection of the formula for

the Laspeyres price index, namely, that the index is meaningful and calculable as the proportionate change in the cost of purchasing the base year basket, even when some of the prices are zero.

91 There may appear to be a technical difficulty with a Laspeyres price index when the index is written as a weighted average of the price relatives using expenditures in the first period as weights. When a good is free in the first period its weight is zero and its price relative is infinity. However, a Laspeyres index is mathematically identical with a weighted average of the relatives only on the assumption that all prices are positive in the first year. This is an unnecessary and invalid assumption from an economic point of view as a zero price is economically meaningful. ¹¹

92 Thus, goods or services which switch from having zero to positive prices can easily be accommodated within conventional price indexes provided there are also sufficient goods and services with positive prices in both periods. Conversely, the inclusion of some goods or services whose prices drop from a positive amount to zero, i.e., become free goods, also poses no problems. Finally, it may be noted that these cases are totally different from new goods and disappearing goods where the quantities are zero in one or other period. The problem with new and disappearing goods is that when the quantities are zero the prices are not merely unknown but non-existent, whereas when non-market goods or services are provided free their quantities are very real and observable.

¹ The original version of this paper was commissioned by Eurostat, but the author accepts full responsibility for the contents of the present paper which do not necessarily represent the views of Eurostat.

² R. Dornbusch and S. Fischer (1994): Macroeconomics, p. 10.

³ D. Laidler and M. Parkin: 'Inflation: a survey', Economic Journal, 85, Dec.

1975, p. 741.

⁴ It should be noted however that the weights for the equivalent price index cannot be derived without already knowing the COL so that the index does not provide an alternative way of estimating a COL. It simply provides an alternative way or interpreting a COL. To estimate the COL, it is necessary to use a superlative index, such as the Fisher, in practice.

⁵ As market transactions include barter transactions and also payments in kind, inflation should not be described as a phenomenon manifesting itself in market transactions. It manifest itself only in monetary transactions, which constitute only a subset of market transactions.

⁶ R. A. Pollak, The Theory of the Cost-of-Living Index, Oxford University Press, New York, Oxford, 1989, p. 6.

⁷ This kind of argument is also used in the Annex to this paper to justify estimating a price index for (imputed) government expenditures on social transfers in kind on the basis of the actual monetary expenditures incurred in their production.

⁸ The production of agricultural goods by households for own consumption is specifically included within the production boundary of both the the 1993 SNA and the 1995 ESA.

⁹ Fixed assets are defined as produced assets that are themselves used repeatedly, or continuously, in processes of production for more than one year (1993 SNA, para.10.7). In practice, tangible fixed assets consist of buildings and other structures, machinery and equipment.

¹⁰ The following definition is given in para. 6.50 of the 1993 SNA : "A price is said to be **not economically significant** when it has little or no influence on how much the producer is prepared to supply and is expected to have only a marginal influence on the quantities demanded. It is thus a price that is not quantitatively significant from the point of view of either supply or demand."

¹¹ Pollak remarks in a different context : "The conjecture reflects a basic misconception about cost-of-living indexes. Except in very special cases, the cost-of-living index is not a function of the price relatives, but depends on the reference and comparison price vectors. " Op. cit., p. 68.

ANNEX

Health and education in price indexes for the final consumption expenditures of governments and NPISHs

1. In the context of the present paper it may be of some interest to examine how a price index might be calculated for the expenditures incurred by governments or NPISHs on the non-market health and education goods and services actually consumed by households: that is, for the goods and services provided to households as social transfers in kind. These goods and services should not be included in a CPI but they do enter into the actual consumption of households. For brevity, references to NPISHs will be dropped when they are treated in the same way as governments.
2. As explained in the main text, non-market health and education goods and services provided by governments to households may be divided into two categories.
 - (1) Non-market goods and services produced by enterprises owned and operated by the governments themselves : state schools, hospitals, clinics, etc.
 - (2) Goods and services purchased from market producers and provided as social transfers in kind to households : for example, drugs produced by private manufacturers or perhaps services produced by private hospitals.
3. In either case, the government may or may not charge a price. When a non-market price is charged, the expenditure on the item is shared between the household and the government in proportion to the ratio of the non-market price to the costs of production or market price paid, as the case may be. Of course, if the good or service is provided free, the government incurs the whole of the expenditure.
4. The price to be included in a CPI is the price actually paid by the household, whether it is a market or a non-market price. The price to be included in the price index for government consumption expenditure is therefore the difference between the price paid by the household and **either** the cost to the government of producing it **or** the price paid by the government to the private producer. While an increase in a non-market price increases the price index for household consumption, it simultaneously reduces the index for government consumption.
5. A price index could be defined for total final consumption expenditures in the economy i.e., for the combined final consumption expenditures of households and governments. Such an index would be independent of changes in non-market prices as any increase in the index for households would be offset by the associated reduction in the government index. At the level of the economy as a whole, the index for non-market goods and services would be determined **either** by the costs of producing them in the case of those produced by non-market enterprises owned and operated by government **or** by the market prices paid to the sellers in the case of those purchased by government from private producers.
6. In order to calculate a price index for government expenditures on non-market goods and services provided to households a two stage procedure may be required. Instead of trying to calculate such an index directly, it may be easier to calculate a price index for total (i.e., government plus households') expenditures on non-market goods and services first and then adjust it for any changes in the non-market prices charged by government to households.

7. The calculation of a price index for government purchases of goods and services from private producers is, in principle, straightforward as they are purchased at market prices in monetary transactions. The calculation of a price index for expenditures on the goods and services produced by non-market producers owned and operated by government units is much more difficult because the outputs are purchased by the same units as produced them. (This is not production for own consumption as understood throughout the main text of this paper because, although the consumption **expenditures** are incurred by the same units that produced the goods and services, they are **actually consumed** by different units, namely households.)

8. In national accounts, the traditional solution has been to impute a value for the outputs equal to their costs of production on the grounds that it is not feasible to value them at market prices. The value of the government's **expenditures** on them, is then given by the imputed value of the output **less** the amounts paid by households when governments charge non-market prices (see paras. 6.92 and 9.78 of the 1993 SNA and paras 3.78 and 3.79 of the 1995 ESA).

9. When non-market outputs have to be valued at costs, the output price index must measure changes in the costs per unit of output. A unit cost index can be accepted as a second best measure of inflation for non-market output in these circumstances. Most of the costs are incurred in monetary transactions in the same way as for market producers.

10. Changes in costs per unit of output can only be measured if the outputs can be identified. This typically presents problems either on a conceptual level or through lack of data. It is not appropriate to pursue these problems further in the present context, but it may be noted that that a third best measure of inflation is available in the form of an index of input prices if it is not possible to measure output changes.

11. It was sometimes argued in the early days of national accounting that governments' expenditures on the inputs into non-market production are, in a sense, final in themselves as the governments do not actually incur any further expenditures on the goods and services. This simplifies the problem considerably as there is no longer any need to try to identify or measure the outputs. The input price index then becomes the appropriate final expenditure index. Conceptually, this solution is not very satisfactory, however, as the distinction between inputs and outputs is a very real and fundamental one. In reality, it is clear that households consume health and education services and not the inputs into their production.

12. Assuming a price or unit cost index can be compiled for total (government plus household) expenditures on non-market goods and services provided to households, the separate index for the government's share can then be derived by adjusting it for the index for the households' share. The latter is calculated directly from changes in the non-market prices charged by governments and forms part of the CPI. The index for the government's share is the relevant price index for the non-market health and education services actually consumed by households as social transfers in kind and which are outside the CPI.

13. Finally, it is worth noting that, whereas data on the non-market prices paid by households can be collected with the same frequency and speed as other prices that enter into CPIs, it is unlikely that price indices for government expenditures on non-market goods and services can be estimated monthly, especially if estimates of changes in productivity are needed. At best, it may only be feasible to calculate the government indices quarterly and with a longer time lag than monthly CPIs.

