SOME CONCEPTUAL DILEMMAS IN THE USE OF PRESENT NATIONAL ACCOUNTS

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The following note is a very concise summary of a paper[2] that was presented at the 17th General Conference of the International Association for Research in Income and Wealth at Montvillargenne, August, 1981. As such it may be considered a new paper, although it contains practically all the conceptual issues of the orginal paper. As in the original paper its intention is only to place these issues before a wider audience, while specific solutions will have to wait for a more detailed treatment. All issues concern certain conceptual dilemmas, arising in particular in the use of national accounts when available concepts do not coincide with those for which data are sought. A decision to change the existing basic concepts would however require not only the support of the scholars in this field but also the co-operation of the users of national accounts. Due to extreme summarizing, certain statements are now fairly compact—compared with the original paper. It is nevertheless hoped that the basic problems still shine through. The following note gives instances in which the traditional national accounts, as established according to existing rules and statistics, may not suffice for actual data requirements, yielding differences in growth rates of several percentage points.

According to the dictionary, "dilemma" is "a choice between equally unsatisfactory alternatives". This describes well the situation in many instances in present national accounts (of which this note will give ten examples), where unsolved conceptual problems exist which leave the user of the national accounts with unsatisfactory choices. For 15 years the author has stressed the point that these dilemmas exist, calling at the same time for a general conceptual foundation of national accounts. But during these 15 years there have been two commonly heard views:
— national accounts are well established and are no longer a subject of great evolution; or
— national accounts have just undergone a major revision, so that no major changes should be expected for a long time, with certain envisaged changes still even needing to be implemented.

The first one would imply that the accounts have grown as far as they could, already a long time ago, while the second one implies that they have just grown up and in the right direction. However, both arguments would be justified only if national accounts had been entirely established on *standard principles* for *general concepts* and for *complete data sets*, and if this had been done either at their very beginning, or at their latest revision. Since none of these three conditions applies to present national accounts in the rigorous form of the statement, in particular not for quantities, but not even for values, national accounts have yet to come of age. The present note shows that users will find

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[2] "On Possible Repercussions of Inadequate Measurement of Macro-Economic Data on Economic Policy Issues".

ample justification for this statement—since implicit concepts of producers of data and of users of data do not coincide.

Most dilemmas arise from the fact that the purpose of national accounts has never been defined; on the contrary, the accounts were conceived as "all-purpose" measures. This would require that national accounts represent the largest possible set of data, under a general definition with appropriate sub-sets. Yet neither of the two is true: the total set and all sub-sets defined are more or less incomplete. *Definite* measures (i.e. one-purpose measures), on the other hand, can normally be given only by *complete* data sets, and each different measure normally requires a *different* data set. In addition, a number of measures should be of a quantity nature; however, quantities have not yet been defined in national accounts; at best there are deflated values.

This incompleteness may be of minor importance when economic development is relatively homogeneous (in which case the missing parts will be largely proportional), or when these parts are thought to be small or are considered not to be of any additional explanatory value for economic analysis. The latter has been the case for a long time for all *non-observed* market values, most *non-market* values, and, in particular, for all data that cannot be derived by standard statistical observation but must be *estimated* in any case. Lately, however, it has been recognized that these data may have a significant role, and may vary in their share over the cycle, so that corresponding totals including these items explicitly may differ considerably from present totals.

It is the purpose of the following examples to show that a problem exists in each case, mostly of a conceptual nature and giving rise to a dilemma exactly because the present national accounts do not solve the conceptual issues for all users, so that their data can only be unsatisfactorily measured with the available concepts. When *users* then take the available data as being those of the unsolved concept, discrepancies in interpretation must—and do—ensue.

1. Unobserved Elements

One of the main problems that national accountants are facing at present is that of the measurement of the "hidden" or "underground" economy. The dilemma arises from the fact that within the rules and definitions of the present 35-year-old national accounts concepts there is very little room for hidden or unaccounted-for elements. Most of those items that are usually referred to as "underground" fall outside the present national accounts definitions and thus cannot be covered within them—not even by estimates—as official rules would not permit it. Thus, the unmeasured part of *traditional* national accounts remains negligible and relatively constant,[3] while further and much larger unmeasured parts exist, *outside* of the traditional frame. Hence the dilemma that only unsatisfactory data are available *inside* that frame.

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[3]Cf. e.g. Blades, D., The Hidden Economy and National Accounts, in the OECD OBSERVER, Jan. 1982, pp. 15–17.

2. SERVICES AND GOODS

Another problem is the distinction between "goods" and "services." At present, "goods" and "services" have not been defined other than being the products of goods-producing or services-producing industries. However, each of these may produce the product of the other, and it is not at all clear where the border lies. When the producer of a service is also its "trader," the situation is the same as for goods made on order and immediately turned over to the user. The situation is substantially different, however, when the actual *producing* agent, i.e. normally a salaried employee, is not identical with the *trading* agent, i.e. with some other employee, or the employer himself:

In this case even for services there is a product which passes through different stages before reaching the present production boundary, and it would be advisable either to consider this product as a good or to distinguish several separate services. This can be particularly important for the interpretation of service *quantities* (and for the corresponding productivity measurement), e.g. in all cases where the *same* "service" is made available to a *number* of "users." The different stages are relevant, e.g. in writing books, in university lectures, in transport enterprises, in performances of theatre plays, etc.; the amount of product of the (primary) producer does not depend on the number of readers, students, passengers, listeners, but it does for the product of the "trader" (publisher, university, seller of transport function, theatre owner, etc.).

While the total *value* would be the same for the *sum* of all stages whether the product is considered as one or several services (or goods), this would *not* be the case for the *quantities*—which could solve the present dilemma by permitting so far missing distinctions.

3. "ACTUAL" CONSUMPTION

The problem with the definition of consumption in the present System of National Accounts (SNA) is that it does not comprise all *actual* consumption of households as such or when purchased by government or enterprises for households. In particular, the SNA item does not represent either the total monetary expenditure of households for actual consumption nor does it include all quantities actually consumed by members of private households. The SNA aggregate, therefore, does not measure the activity of consuming, but measures only that *part* of total consumption consisting in the value of (actual or analogous) "market" purchases, at the time of these purchases.

Economic policy, on the other hand, would be interested either in a much wider aggregate (= total consumption) or in a much narrower aggregate (=total monetary expenditure of households). The present SNA aggregate is something in between, closer to the second, but with substantial amendments, because of the general production concept (i.e. minus "intermediate" consumption) and because of addition of analogous items (e.g. self-consumption of agricultural production).

If it were not for the rigidity of the present system or if the system were defined by functional rather than institutional criteria, it would not be too difficult

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to re-arrange existing constituent parts of the present system into a measure of (supplied, but not necessarily used) *actual* private consumption. Such a measure could be defined as the sum of the following items—most of which are elements of the present framework, but are found in different places and not always separately:

Consumer goods and services
—purchased by consumers for their own use
—purchased by consumers and reimbursed by enterprises
—purchased by enterprises for consumers
—supplied in kind by enterprises
—supplied in kind by government
—supplied by own production as professional work
—supplied by own production as non-professional "work"
—supplied by non-profit institutions
—supplied by other consumers.

4. INVESTMENT DATA

(Net) fixed "investment" is—in the present accounts in which the concepts of expenditure are institutionally defined—practically non-consumption, non-exports, non-change-in-stocks, and it is not the increase of the economy's capacity to produce—as investment is taken to be in theoretical considerations. "Investment" in national accounts does not merely consist of observable complete machinery (incl. ancillary costs, which may raise an argument about whether these are capacity-increasing) but also of a substantial amount of major repairs which simply rejuvenate the machinery without adding any new capacity. It is for this reason that "investment" is included here in the points of argument concerning missing information in the 35-year-old system of national accounts. In this system no distinction is made between capacity-increasing and other investment, although appropriate definitions of underlying elements could supply bases for estimates in this direction—given the fact that most data are not open to mere observation anyway. The point is thus pertinent because the *character* of a certain part of actual data (that is sufficiently different to change the meaning of a growth rate or a share or an amount) is not measured in the present officially published data. Or, in other words, the data that are merely given as "investment" (or their corresponding growth rates) are used as such for evaluating changes in productive capacity, but simply may or may not have this property; and, in addition, the share of the various components will again change over the cycle or at shocks.

5. PRICES AND QUANTITIES

Economic theory and national accounts practice propose "that a money value total can change either through a change in the level of prices at which the various units are valued, or through a change in the number of units, or both",[4] and that "the basic objective is to try to distinguish real changes occurring

[4]Ackley, G., *Macroeconomic Theory*, Macmillan Company, New York, 1968.

in the economic system which are attributable to changes in the scale at which various economic activities take place from changes which are recorded in the accounts simply as a result of changes in the monetary units—i.e. generally, but not invariably, prices—in which the activities are measured".[5] And current economic analysis follows suit by considering price changes as a purely monetary inflation of flows or stocks of goods and services (implying that the current values may be deflated by this price change in order to arrive at an underlying "real" movement).

At the same time it is acknowledged that changes in the corresponding "quantity" data, resulting from this deflation, i.e. the macro-economic *volume* data, comprise at least three components[6] of which only one relates to the change in physical quantities, while the other two are structural components which will have substantial values at times of general economic changes, even when the underlying physical quantities do not change at all.

Thus the dilemma arises; these three plus the price deflator represent already *four* components, while for pragmatic convenience it is still assumed that quantity and price changes can be considered as the only *two* components of value changes. This belief is sustained by the apparently complementary nature of the Paasche and Laspeyres indices, which obviously on a formal theoretical level permit a clear separation of value indices into two components (i.e. $Lq \times Pp$ or $Pq \times Lp$).[7] However, changes in aggregate values may occur without any change in the "pure" price and/or quantity component because of structural changes, so that there should be at least one other component to be taken into consideration, if the purpose is to measure pure changes in prices and/or quantities.

It is for these reasons (i.e. the presence and the magnitudes of structural components, which change according to the general economic situation) that macro-economic aggregates "at constant prices" will represent underlying quantity movements fairly correctly at times when major changes in their structure do not occur, but will *not* when they do. As a consequence, macro-economic growth rates and corresponding price changes (which often also include structural components) will have to be interpreted differently at such times, since their magnitudes may indicate entirely different underlying elements. Unfortunately, macro-statisticians believe that the structural elements are insignificant and therefore do not even *try* to calculate or estimate those components separately,

[5]Hill, T. P., A System of Integrated Price and Volume Measures (Indices), EEC, OS/2663/72-E, later published in *Statistical Studies and Surveys*, 3/1972, Brussels.

[6]Volumes resulting implicitly from dividing values by "pure" price indices and which so distinguish as many quantities as there are different prices have well-known properties which have been described (cf. T. P. Hill, op.cit., para. 217) for the corresponding volume index as:
"A volume index is affected by three factors:
 (i) a volume index moves in response to changes in the quantities of the group of products covered by the index;
 (ii) it also moves in response to changes in the quality of the products concerned;
 (iii) it is also affected by a switch or redistribution in the composition of the uses to which the products are put, whenever the products are sold for different uses at different prices";
i.e. changes in quantity, changes in quality structure, and—also included in volume changes in this procedure—changes in price structure.

[7]Read "Laspeyres quantity index times Paasche price index," etc. In economic terms, however, the two components in those cases are not strictly comparable, since they are weighted at different periods. This fact in itself should have led long ago to at least three components being distinguished.

so that macro growth rates and price changes when calculated according to the *present* procedure may become quite meaningless at times of *major* changes in the economic structure, while other data are *not* available at all. However, it has been shown that the difference between Paasche and Laspeyres indices may be as large as *one third* of the total increase.[8]

A four (or five)-element method, on the other hand, would solve the dilemma. It could also make use of several Laspeyres components, e.g. divide values first into (*a*) a Laspeyres price and (*b*) an implicit Paasche component (as is frequently done in developing countries) and split this component up further into (*i*) quantities at corresponding base period prices (= Laspeyres volume), and (*ii*) quantities at an average unit value for all same qualities (= "pure" quantity). Dividing (*b*) by (*i*) will show one structural component; dividing (*i*) by (*ii*) will show another, with different explanatory value:

$$ii \cdot i/ii \cdot b/i \cdot a/c \cdot c = a \cdot b.$$

In addition, the price index (*a*) should be reweighted by quantity values as they result from (*ii*), to yield a "pure" price element (*c*) and the difference should be considered as another structural element (*a*/*c*). The magnitudes of these structural components are such that they could easily outweigh the "pure" components when these are small.

6. OUTPUT

A number of economic variables which, in principle, should be related to *output* are usually related to national product, or *value added* (because conceptually defined data for sectoral outputs are not usually available). However, it is *only* for the overall total that intermediate input *equals* intermediate consumption, so that *total* national product (i.e. national "output") equals *total* value added:

  (i) gross output = intermediate input + gross value added
  (ii) gross output = intermediate consumption + final goods and services.

Problems arise, therefore, for all studies based on outputs, in a *sectoral* approach, because value added will not represent the "output" per sector, since value added by sector is an *input* measure (i.e. wages and salaries, entrepreneurial income, capital consumption, and residual incomes), while for the *whole* economy the final product (which, at the same time, is the sum of *all* value added) does represent the total unduplicated "*output*" of a country.

A dilemma arises, furthermore, for the volume of this "output", even for a country as a whole, because of the fact that only at *current* prices is there a single result for output minus intermediate input (which is equal to value added), while input and output flows at *constant* prices may represent quantities *either* all in terms of the consumers' view (i.e. in physical output units, e.g. "one egg") *or* all in terms of the producers' views (sum of all quantity *inputs*)—which is *not*

[8]Cf. Horner, F. B., Effect of Grouping of Data on the Divergence between Laspeyres and Paasche Forms of Quantum Indexes, with an Appendix, The Effects of Aggregation on the Divergence between Laspeyres and Paasche's Index Numbers, by Coleman, E. R., *The Review of Income and Wealth*, Sept. 1971, pp. 263–272.

the same.[9] There can thus be different results for output minus input at constant prices—when calculated either from cost or from output elements. Producers' views, however—should also be the ones used for calculating the quantity of final goods and services, while corresponding constant price estimates normally use output unit prices (= consumers' views), even for the deflation of inputs incl. value added. For these various reasons, value added is *not* representative of "output" or "product" movements, in particular not for movements in output quantity in any sub-sector.

Finally, it may be recalled that output shows different growth rates from value added (which is output minus input) when growth rates of outputs and of inputs differ—which is normally the case, and this will be particularly substantial at times of major structural changes.

7. THE INCREMENTAL CAPITAL-OUTPUT RATIO (ICOR)

The incremental capital-output ratio (ICOR) is the ratio of the change of capital used for output in two different periods to the change in output. Certain economic analyses apply something also called "ICOR", but use *investment* and the change in *product* instead of the above variables. However, if a ratio of investment to the change in product (which is often mistaken for the incremental capital-output ratio, probably because investment seems to be synonymous with "adding to assets") is used, it may (and does) have entirely different properties than those ICORs are alleged to have. This dilemma arises mainly from the general lack of appropriate data—which should, of course, be no excuse—but also from the fact that no investment concept yields the capacity increase for which it is usually taken.

False "ICORs" will vary *inversely* with the growth rate, whereas only if one deducts from investment an estimated amount for retirements (= actual discards), before calculating the ratio, do the inverse relations disappear. If false "ICORs" are used in economic analyses, this will also give rise to false interpretations of capacity utilization, or to a false magnitude of the dependent variable if this is estimated with the help of a false "ICOR". The dilemma can only be solved with a "capacity" definition of investment (cf. point 4 above) and corresponding capital stock calculations, to be used in correct ICORs.

8. LABOUR INPUT

Certain economic analyses are based on variables *per unit* of labour input. Current statistics on employment (taken as the labour input) make no distinction between different kinds of *hours worked* other than—at best—by economic activity and/or by sex. Yet, numbers employed or hours worked are *not* a measure of the quantity (unit) of labour input; it is only a measure of "time spent on producing something".

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[9]Actually, also prices may reflect producers' or purchasers' views. If price = value per unit of physical item, producers' prices = unit values of costs, purchasers' "prices" = unit values of outputs (*aggregate* costs). In fact, purchasers' "prices" may change while all cost *prices* remain stable.

In fact, the measurement unit of labour input must have the *dimension* of time worked. This does not exclude—in fact, it actually requires—further specification ("weight", for instance, is a dimension, of which kgs or tons are specific measurement units).

This still generally missing adjustment for different quality (i.e. weighting) of hours worked hides all structural changes in the input of labour. Assuming that different quality also means different quantity, the same number of total hours worked may thus represent more or less quantity of actual labour input when the structure of the total sum of hours worked differs. Such changes in the structure of employment have, however, occurred on a large scale in past years and in the aftermaths of the oil shocks, but at the same time have been largely hidden by the actual methods applied.

9. PRODUCTIVITY

Labour productivity is usually taken as "output per person" (or, better, per man-hour). "Output," in turn, is usually taken as the contribution to gross national or domestic product per person (or per man-hour). This definition is, in fact, now almost universal for various reasons; any possible component (whose change may be responsible for a change in the total) is considered as an additional explanatory variable (e.g. difference in structure or difference in various inputs).

Such crude "productivity" data may therefore be *biased* in various respects.

(i) They do not distinguish between changes in the product of persons who *remain in* the same production process and changes in the product of persons who *change to* a different production process. Since in a different production process the inputs, other than labour, will normally be different, the "product per person" will then also differ. When the same labour is supplied in the production of a product which has a higher *value* (usually because of more, or more complicated, inputs), its crude productivity will appear to be higher.

(ii) They do not distinguish between different qualities of labour. This applies, in fact, to "persons" as well as to "hours." In other words, different qualities are not weighted differently. The "product per person (or per hour)" may *change* simply because the quality of the labour input has changed, while the result per same quality (i.e. the productivity) would actually remain the *same*. In other words: weighted quality will become different quantities, or the arithmetical results suffer from the fact that the unit "person" or "hour" does not represent a unit for the actual quantity input of labour (cf. point 8 above).

(iii) The "product" (=value added) data as such (that is, the numerator in the division of the two series yielding the productivity series), apart from the structural effects under (i) above, may be biased through the way in which the "values at constant prices" are calculated (cf. point 6 above). The results will be different when they represent *valued* quantities, using constant prices, or when they represent values *deflated* with price movements, depending further on the *kinds* of prices used.

(iv) In addition, it is possible—at the level of the whole economy—that increases in intermediate input prices may be offset by accordingly changing value added components (e.g. by using cheaper labour and/or changing profits),

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while all quantities and all gross *output* prices may actually stay the same. In this case, (crude) productivity as derived from value added would appear to change because value added and thus the value of total net product—at current and constant prices—is reduced, while actual *quantities* are unchanged. The quantities underlying these reduced values may even have increased, namely, when a greater output meets insufficient demand (or, simply, greater competition) and is sold partly at special rebate prices which are not usually registered in indices of average *list* prices.

Since changes in the product structure, changes in the structure of labour inputs, and changes in price structure have been considerable at the times of the major shocks, amounting, furthermore, to several percentage points of the changes in the underlying variables, the ratio of labour input and product (output) in crude productivity—as derived from *available* data—may show apparently unexplained movements in these periods, which would not appear had the original data been properly amended. Or, in other words, crude productivity is an aggregate of several different effects such that any change in *this* productivity may or may not be due to what are apparently the only *two* components (i.e. "output" and "labour").

10. The Savings Rate

The last example of a dilemma that national accountants and economists encounter together is "the" savings rate, as defined at present.

The manner in which gross output—synonymous with *"production"*—is valued, and the time at which it is recorded define the actual scope of the total framework; it also sets the principles of valuation and of the time of recording in the case of the *uses* made of goods and services in the present SNA. Thus, net production ("the value added") is equated with "income," and the sale of consumer and investment goods is recorded as "consumption" and "investment". The difference between this "income" (paid through households, net of taxes, etc.) and this "consumption" is represented in the usual savings rate. The content of these "savings" depends on the content of *this* income and *this* consumption (cf. also point 1 and 3 above). Thus it cannot relate anything that is *not* "income" or "consumption" in the traditional system of national accounts.

Unexplained movements in the savings rate or recently proposed astonishing differences in its size, are mostly due to developments in data that are not included in the present definitions of savings in the SNA. For example, Townsend–Greenspan[10] pointed out that consumers also have gains from appreciation of their assets (which is not included in SNA "income") and save (all or part of) it, thus raising the "actual" savings rate not only to twice the size of the traditional rate, but the rate even rises where the traditional rate falls.

"The" savings rate, therefore, suffers from the fact that all three components: savings as such, income, and consumption are measured strictly (and only) within the traditional system.

[10]Cf. The Wall Street Journal, January 21, 1980.

The present system is conceptually 35 years old. During those 35 years, there have been many additions—but there have hardly been any changes in the basic concepts. Merely more and more details have been added within the old conceptual frame, although this was primarily pragmatic at the outset and followed available statistics (or did not exceed them by much). Since Statistical Offices continued to build around this frame, new data outside this frame have not been considered—and have thus not been recorded (as in the case of actually used quantities at zero prices, even if others under similar circumstances have to pay for them).

Pragmatic considerations—but also technical constraints—have tended to outweigh general conceptual foundations in the application of systems of national accounts since these were first established. In fact, the *users* of national accounts have not *defined* the variables that they would *like* to see in national accounts, either for the use of economic theory or for economic policy. At the same time, changes of a few decimal points in the growth rates (or in ratios, e.g. in the savings rate) of the traditionally defined variables are often considered—by the users—essential indicators of economic development. Therefore, the question as to whether the measurement procedures of certain macro-economic variables are yielding the intended data has arisen. Economists are beginning to realise that their concepts and the existing data may be incompatible or that data and concepts may be incomplete, in the present framework of rules and statistics, in particular, because these differences may lead to growth rates which differ to the order of several percentage points.

The present situation could however be quickly improved—and the present dilemmas avoided—if basic *definitions* were established and *data* according to these definitions were looked for, off the beaten tracks of existing statistics—if only, at first, as (separate) amendments.