Measurements Based on Time Use Statistics

Some Issues[1]

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What Do Time Use Data Tell Us?

Information collected through time use surveys has three components: (1) information collected through the background schedule, i.e. the data on the background of the respondent, (2) the time use pattern of the respondent, i.e. the details about how the respondent has spent his / her time and (3) the context of the time use activities through contextual variables. The background schedule collects all the relevant information on the respondents depending on the objectives of the survey. Generally it collects information about the socio-economic characteristics of the household as well as the individual and any other information, which can be related to their time use to understand the time use better. For example, the background information can help in analyzing the time use patterns of the poor and non-poor, of men and women, of children going to school and not going to school, a married woman or a single woman, different ethnic groups etc. The time use survey component collects detailed information on how individuals spend their time on a daily and weekly basis, while contextual variables basically provide the context of time use activities. Contextual variables provide critical information about the activities in a manner that the utility of the information on the time use is enhanced considerably. The major contextual variables are about (1) the location of time use activities (for example, whether the activity is performed inside or outside home) (2) for whom or for what purpose is the activity performed (for example, whether the activity is for self consumption or for sale), (3) the activity is performed with whom or accompanied by whom (for example, whether the activity is performed with children or adult or others) and (4) any other characteristics of time use activities, such as whether the activity is paid (remunerated directly) or unpaid. The background schedule, the comprehensive details of the time use and the context of the activities together provide wealth of information which has immense possibilities of uses for different purposes.

Again, time use surveys need not be independent surveys. They can also be linked with other surveys to relate the time use information with other relevant areas of study. For example, these can be module on time use survey in a labour and employment survey (Benin, Nepal), or it can be a module of a survey on living conditions (Guatemala), or it can be a module in an expenditure and consumption survey (Lao PDR, Oman). Such modules can add to the information collected in the main survey to make the information

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relevant to the objective of the survey. Time use surveys can also be linked with other surveys to use the information of the two surveys together to serve a common objective. For example, Republic of Korea used its time use survey results along with the results of the household expenditure survey to prepare satellite accounts of unpaid work.

Several measurements, indicators and indices can be developed to use these data meaningfully. In this paper we will discuss the issues relating to the use of time use data (1) in estimating accurately the GDP, (2) in monetary valuation of unpaid work, and (3) in preparing national time accounts and time based social indicators

Improved Measurement of Gross Domestic Product

The problem areas for the estimates of the gross domestic product (GDP) in an economy are the areas of the non-observed economy, namely, underground production, illegal production, informal production and subsistence production (OECD 2002).

Underground production is defined as that production, which is legal but is deliberately concealed from the public authorities to avoid payment of taxes or complying with regulations. A part of the underground production comes from self employed workers and production units who subcontract their work to workers at home. *Illegal production* is defined as production of goods and services forbidden b law or is unlawful when carried out by unauthorized producers. *Informal sector production* is the production that is under taken by unincorporated enterprises in the household sector. These units are generally unregistered and have a very small size. S*ubsistence production* or production of households for their own final use is the production of goods and services consumed or capitalized by the households that produce them. The UNSNA 1993 has added a caveat that subsistence production is to be included in the GDP only if it is of a significant scale, the significance being defined as "quantitatively important production in relation to the total supply of that good in the country".

It needs to be noted that there is some overlapping in this classification, particularly between informal sector and illegal production, and between informal and subsistence production. A part of illegal productions is some times carried out in the informal sector and a part of production of informal units is frequently self-consumed. Time use data are likely to help in getting improved estimates of production in the informal sector and subsistence sector, and of illegal production to the extent it is located in the informal sector.

1. Measuring Production from the Informal Economy Using Time Use Statistics

There are three approaches to measuring GDP: the production approach, the expenditure approach and the income approach. In the production approach the starting point is to measure output and intermediate consumption of goods and services, obtain the value added as the difference between output and intermediate consumption, and sum up the values added by different producers to obtain the GDP. In the expenditure approach, the

GDP is measured as the sum of expenditure components (namely final consumption expenditure, gross capital formation and net experts). The income approach directly measures the income arising from production –largely the wages paid to employees and the operating surplus/ mixed income coming form productive activities. These approaches are seldom used completely independently from each other, as they often use the same basic data. In practice therefore national accounts compilation is often a patchwork with some elements estimated from the production approach, others from the expenditure approach and still others from the income approach (OECD 2002).

In the case of the informal economy, the major problems with respect to data are under coverage of enterprises, under reporting of enterprises and non-response of enterprises. This is primarily because the informal economy, which is highly heterogeneous, covers a large variety of economic activities, such as, own account workers (self employed) managing their own enterprises; persons engaged in petty trade, petty manufacturing and petty services; home workers and home based workers who are partly piece rated wage earners and partly informal enterprises; and other informal workers engaged in small and petty economic activities. Since these activities are short term, temporary, scattered, and sporadic, these are not captured adequately by conventional surveys.

As a result, a common practice in several developing economies is to estimate the average production of workers by conducting special surveys for the sectors in which informal economy is operating, and multiplying the production with the number of workers employed in the sector. The employment data are captured through conventional employment / labour force surveys. Such an approach, however, frequently leads to under estimation of the output, as the conventional labour force surveys are observed to be under reporting workers. (Hirway 2002).

Time use surveys are expected to net the informal workers adequately. Since time use surveys collect comprehensive information about how people spend their time on different activities, a good classification of activities can provide improved estimates of workers, who are employed temporarily, seasonally or sporadically, as self employed, as unpaid family workers, as causal labour or a home workers or home based workers. Improved estimates of workers, then leads to improved estimates of production from a number of activites located in the informal economy.

It is frequently argued that adding supplementary questions to labour force surveys will provide correct estimates of informal workers. It is also argued that adding supplementary questions to household income and expenditure surveys will provide data on goods and services produced by the informal sector. However, experiences in India have shown that time use data clearly have an advantage in getting improved estimates of workers engaged in the different sectors of the informal economy. (Saha 2003, Hirway 2003). In fact, an expert committee of the department of statistics, government of India, has recently finalized the classification of time use activities in a manner that it will help in estimating employment in the informal sector.[3]

[3] The author is a member of this Expert Committee

There can be two approaches of estimating additions to the GDP: (1) independent valuation from the informal economy and (2) improving existing estimates by using improved estimates of the work force engaged in the different sectors of the informal economy. Unfortunately none of these have been tried out in any country so far.

2. Improved GDP Estimates for the Subsistence Sector

The 1993 SNA has included several non- market activities under the purview of the SNA production boundary. The production of goods and services for own final use by household members, now included in the UNSNA, is the following:

- Household production of goods for own final use, including crops and livestock, production of other goods for own consumptions and own account fixed capital formation.
- Owner- occupied dwelling services, and
- Paid domestic services, i.e by employment of paid domestic staff.

The 1993 SNA has given an illustrative list of such production, which includes production in agriculture, allied activities, cloth & dresses and other home made products Measurement of these activities in the national accounts is important, as they constitute an important component of the total consumption of people, particularly in developing countries. Their inclusion is also important because during the period of economic crisis, many households depend on these activities for their survival.

Most developing countries, however, have not yet implemented this recommendation of adding self-consumption of goods in their national income accounts, largely because of the problems relating to methods and data. It has been recommended, however, that these countries should conduct income - expenditure surveys, budget-consumption surveys, living conditions or living standard surveys on a regular basis to get these data. It is underlined by experts that 'for most types of production for own use by rural households, reliable data can be obtained only by direct surveys of consumption (OECD 2002). A well-designed nations wide survey, with a large team of trained enumerators and supervisors is needed to conduct such a survey.

Time use surveys can be of great help in capturing the data on self consumption, particularly in countries where household production for own use is wide spread but where market prices for such goods exist only in urban areas and do not apply to rural areas OECD 2002). Monetary valuation of cost of productions may be a good option when labour is the main input in the production process, and the time spent is known (for example, on collection of fuel wood, fodder etc). In other words, the time spent on these activities, multiplied by the prevalent wage rate will be a good way of estimating the value of these goods.

Alternatively, time use data can be used in estimating number of persons engaged in production of goods for own use (with the help of an appropriate contextual variable) and the time spent by them on this production. The value of the product of the two will represent the value of the output.

In short, time use surveys can improve the GDP estimates by providing improved estimates of the output of the informal sector and by estimating the value of production of goods for self-consumption.

Valuation of Unpaid ESNA Work

Valuation of unpaid work is an area of extensive debate in the literature. On the one hand there are experts who argue against valuation on the ground that the underlying assumptions are highly unrealistic, while on the other hand elaborate methodologies for valuation have been presented and used.

Why Value Unpaid Work?

The first set of questions that arise in the context of valuation of unpaid work is regarding the reasons for valuation. It is argued that by undertaking valuation, one compares apples with oranges, because both SNA and ESNA systems operate differently. For example, economic work in the market is performed under competitive environment, where efficiency and productivity matter, while household work (and voluntary work) is carried out with in the household environment where time is elastic (work can linger for a long time if there is no hurry) and where there is no pressure of competition or of earning profits. Household work is tailor made for clients (household members), performed in a home environment. Why compare non-comparables?

It is also argued that monetary imputation of unpaid work is not consistent with the concept of theory of value in economics. Exchange process is essential for any economic valuation, and when there is no exchange, it is difficult to put any value to that activity. (Mac Donald 2000). In addition, there are some theoretical concerns expressed about aggregating market work and household work. The aggregation will create questions regarding the validity of the present fiscal and monitoring policies, employment and labour market policies etc. What will one gain by raising the GDP by 30 to 40 percent? What will happen to the policies pertaining to business cycles, when business cycles may disappear or decline substantially if SNA and ESNA work are added? Clearly, the inclusion will raise theoretical questions, which have to be addressed by economists.

Valuation will involve a large number of assumptions, such as, the quality of household services remains the same from each household (for example, the meals cooked, the care provided to children etc have the same quality in each household), or the quality of the product is as good of as bad as of the similar product produced in the market; or that the wage rate will not decline if housewives enter the labour market on al large scale. Since these assumptions are not realistic, the valuation will not be justifiable. In addition, there

are serious problems, about the availability of the required data and about the methodology of valuation. No standard methodologies have been developed so far. In fact, different methods are likely to give different values of the same service: for example fetching water can be the value of the time spent on fetching water (computed on the basis of the time spent) or the value of the water (production cost of water). The input method will measure the burden, while the output method will value the product.

In spite of these problems, however, valuation of unpaid work is essential on the following grounds:

- Like economic work, unpaid work contributes to human well being. In fact, the contribution of unpaid work is fairly comparable with the same of the economic work. If we need an aggregate variable to measure the total well being in any economy, it is important to value the unpaid work and add it to the GDP to get a total measure of well being. The GDP is a limited variable to project the status of well being in an economy.

- The valuation will give visibility to the unpaid work in official statistics. (Time accounting will not do it). This will provide the basis for unpaid workers to claim their due share in the state exchequer to improve their conditions. The valuation will be a formal recognition given to unpaid work in macroeconomics and macro economic policy making. Unpaid work will of course include voluntary work.

- Though unpaid work is not exchanged in the market, it is not free. It has a cost, as it uses human capital plus other capital like space, equipments, facilities etc. Unpaid work is also not unlimited, there is a limit to it. In a strict sense therefore unpaid work is an economic good and it needs to be valued.

- An important implication of the valuation of unpaid work will be for women and the poor, as unpaid work is a major constraint to their development opportunities. Valuation of unpaid work will make their contribution visible, highlight the unjust inequalities and justify measures to promote gender equality and poverty reduction.

- There are some other important implications of the valuation. Firstly, the valuation of unpaid work contributed by a woman will improve her claim to insurance, and to compensation in the case of divorce (Republic of Korea is considering introduction of these measures). The valuation will also help in the engenderment of national budgets, as it will justify larger allocations to women's development and empowerment.

In the final analysis, it needs to be recognized that unpaid work is a part of the macro economy. Its valuation will help in understanding its dimensions, its linkages with the paid work and internalize it in macroeconomic decision-making. As is well known, national income estimates are not only macro level estimates of the total well being, but they also form the basis for measuring and monitoring the performance of an economy,

as they throw light on the structure and sources of incomes distribution of incomes and interlinkages of the different components of national incomes. The UNSNA (1993) has very rightly recommended valuation of unpaid work and compilation of satellite accounts for unpaid work. The PFA (Platform For Action) Recommendations of the Beijing World Conference on Women also has included this valuation in its official document.

Methods of Valuation of Unpaid Work

Unpaid work can be broadly divided in to two categories, namely, unpaid domestic work and voluntary work, Valuation of this work can be done either by valuing the labour input that has gone in to the work or by valuing the output generated by the work. The former is known as the input method or a wage based valuation and the latter is known as the output method or product based valuation.

Input method: Under the input method, the value of unpaid work at the individual level is computed by multiplying the time spent by the person on unpaid work with an appropriate wage rate. At the aggregate level, the total time spent on unpaid work is multiplied by a set of appropriate wage rates.

The selection of the wage rate is a very critical issue here. Two types of wage rates may be used: Replacement wage rate i.e. the wage paid to a person who produces a similar service in the market, or the opportunity cost, i.e. the wage rate forgone by the person who is performing the unpaid work. The market replacement wage rate can either be a generalist rate (for example, wage rate of a housekeeper) or can be specialist rates. The generalist wage rate could be the wage of a domestic paid worker, as prevailing in the local market. The specialist wage rates of different specialized activities comparable with the relevant domestic activities.[4]

The opportunity cost, the forgone wages by the persons engaged in unpaid work are calculated on the basis of the age, education and qualification of domestic workers. Valuation of unpaid work based on the opportunity cost determines the values looking at the person (education, age, qualification) and not at the activity. In the case of Republic of Korea three sets of opportunity costs were selected for measuring the unpaid work: (1) the opportunity cost based on age, (2) the opportunity cost based on education and (3) the opportunity cost based on both age and education. (Kim and Moon 2001).

Since the input method is the most common method of valuation used by many countries, there is enough empirical experience available on this. It is generally observed that the value based on the opportunity cost is the highest, followed by the value based on the

[4] For example, in the case of Japan (Fukami 2000) the specialist activities identified for different domestic activities were as follows: 1. Cooking – student chef, 2. Cleaning-building cleaner, 3. Laundry – laundry man, 4. Sewing & Knittiny- sewing machine operator, 5. Miscellaneous Household work- Janitor, 6. Shopping –Janitor, 7. Childcare- KG teacher, 8. Elderly care- Asst nurse, 9. Voluntary work- weighted average of service industry wages

specialist wager rates and then by generalist wage rates. (Kim and Moon 2001, Fukami 2000, Mikami 2000, Goldschmidt- Clermont and Pagnossin – Aligisakis 1995)

It is important to note, however, that there are several assumptions underlying the valuation methods based on the replacement cost method. There is a need to make these assumptions implicit: Under the wage based valuation, with the generalist wage rates, the assumptions are that (1) there are jobs in the market that are comparable with the job of a domestic worker/ housekeeper and (2) the domestic workers are likely to receive the market wages if they entered the market. Under the wage based valuation with the specialized wage rates, the assumptions are that (1) the work of specialist workers is comparable to the corresponding domestic work, That is, the quality of the work is the same as it is in the market, (2) there are specialists available for each domestic work undertaken by domestic unpaid workers and (3) both the work- in the market and at home – are carried out with the same capital intensity.

In the case of the opportunity cost method, the assumptions are much more restrictive: this method assumes that (1) job opportunities are available for unpaid workers as per their age, education and qualification, (2) the wage rate will not decline even when they all enter the labour market and (3) the domestic unpaid workers are well informed about the available choices, these choices are actually available to them and they are 'rational' in their behaviour to reach utility maximization.

***Output Method*:** Under the output method, value of unpaid work is calculated by multiplying the units of output with the wage rate per unit of output. The direct valuation of unpaid work by the output approach would need data on the output of the unpaid work, such as the number of meals prepared, number of clothes washed and ironed, area of house cleaned, children taught etc as well as the data on the wage rate per unit of output, such as the labour charge of each meal prepared, charge per item of clothing washed and ironed, labour charge per child cared etc.

Two approaches can be used in applying the output approach: the direct approach and the indirect approach. Under the direct approach, the value of unpaid work is the value of payment to the contract worker per piece of output, excluding all production costs, such as raw materials, electricity and others. Under the indirect method, the value of unpaid work is the residual of the market value of output when all the non –labour costs are deducted.[5] The estimated value of the unpaid work will be higher under the second approach, as it would implicitly include the operating surplus of the producer for the market.

The output approach also has several underlying assumptions: (1) the quality of products as produced in the different households is the same (for example, quality of meals,

[5] For example, the value of the unpaid work done by a household member who has washed and ironed 20 pieces of dresses can be computed by (1) multiplying labour charge per piece by the number of pieces washed/ironed or by (2) calculating the market value of the total charges of ironing and deducting cost of material from the same. (UN- ESCAP 2003).

quality of child care etc), (2) market prices are available for the outputs generated by unpaid work and (3) the quality of the market products and of the products of the unpaid work are comparable. Once again, these assumptions cannot be said to be very realistic.
It appears that both the methods, the input and the output methods, need unrealistic assumptions, which are inevitable when market rates are used for domestic activities. However, the output approach seem to be more acceptable conceptually because if fits in well with the output based approach of the national accounts. In terms of the availability of data, however, the input approach is better placed, as a result of which most countries like Japan, Republic of Korea, Australia, Canada, and Several European Countries have computed the value of their unpaid work using the input method, while there are rare cases where the output approach is used. (for example, INSTRAW conducted studies in Canada, Finland and Nepal. Refer to Sikoska 2003)

A basic problem with the input method is that it does not consider the productivity and focuses mainly on the time spent on unpaid work. A given consumption level may be achieved in one country with more labour inputs than the other. However, this difference will not be reflected in the valuation with the input method. It is necessary therefore to standardize labour time and to calculate standardised extended per capita (well being) consumption. (Goldschmidt- Clermont and Pagnossin – Aligisakis 1995). The procedure would be of choosing a common labour time for all countries (for instance, a median labour time) and calculate what per capita extended consumption (unpaid work) would have been in each country if total economic time had been equal to the chosen standard.

There is a limited cross-country comparability of the data on the value of unpaid work. This is mainly because of the wide differences in the concepts and methods used by different countries. As seen earlier, the input method is the more common method used by most countries. The lack of standardized labour time on the one hand the variety of the methods and concepts used on the other hand has resulted in to poor comparability of data[6].

Satellite Accounts of Unpaid (ESNA) Work

The 1993 SNA has formally recognized that non-SNA (ESNA) activities are productive and they contribute to well being. It has therefore recommended measurement of these activities in a satellite account, which is linked to the main national account and which uses the same concepts whenever possible. That is, this account will be an extension of the national accounts to include unpaid household services and voluntary services of men and women in a system of household accounts. This account will be separate from, but consistent with the main accounts.

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[6] Some Empirical Results: Though the data on the value of unpaid work are not strictly comparable across countries, we present below some of the following results of the valuation:

To make the valuation of domestic services and voluntary services compatible with the measurement of SNA activities. It will be necessary to turn the services in to the input output framework, the central framework of the main accounts.

The main tasks to be undertaken for the complication of these accounts can be listed as follows:

The first task will be to determine the scope of productive activities to be included, and to identify these activities. The Eurostat has identified five activities, namely, providing housing, nutrition, clothing, care and education, and voluntary activity. The household satellite account in UK (Holloway, Short & Tamplin 2002) has added one more activity, namely, transport. Ironmonger, on the other hand, has observed that unpaid household services can be divided in to 8 household industries, namely, cooking meals, laundry-cleaning, shopping, child care, other care (of the old and the sick), gardening, repair and maintenance and voluntary work. He argues that all these "household industries" can be linked with relevant industries in the market economy. (Ironmonger 1996).

The second major task will be to convert the identified services into output, a physical measurement. For example, number of clothes washed and ironed, number of meals cooked, number of children cared (hours) etc. it is argued by experts that it is possible to convert all unpaid services in to output measures. (Ironmonger 1996). If it is not possible, either the activity is dropped or the input method can be used for such services.

The next step will be to convert the output in to monetary value by multiplying it will the relevant market prices. The underlying assumption here is that the quality of output from all households is the same, and that there is no significant gap between the qualities of the domestic output and the market output. Both the assumptions are not realistic, but they are assumed all the same. One way of minimizing this problem is to categorize the output to differentiate sufficiently between the various types of output, to facilitate a meaningful comparison between the domestic and the corresponding market output. For example, meals can be divided in to breakfast, lunch, snacks etc.

The above step will be followed by measurement and valuation of inputs. These inputs will be labour inputs and capital inputs, i.e. raw materials, rented accommodation, household durable goods etc. The labour input will be measured in time input. Valuation of labour in monetary terms will again raise the questions discussed above in the context of the input method. The Eurostat has used the wages of a housekeeper (the generalist wage rate), while the UK has used the opportunity cost method. (Holloway et al 2002). The labour inputs can be converted in to hours and suitable wages can be used for valuation. It may be added that the wages would be the disposable wages (from the market) exclusive of taxes and inclusive of other benefits)

The valuation of capital can be done in a number of ways. Aslaksen assumes that all household goods are consumed when purchased so that depreciation and income from

capital can be disregarded. Ironmonger recommends accounts of capital inputs by using input- output tables to allocate to all unpaid labour, capital and purchased immediate inputs to all household activities. The capital components are represented by estimates of housing costs plus purchase of vehicles and other household durables. On the other hand the Eurostat recommends that the capital should be treated the way it is treated in the National Accounts.

The final task will be to compile input output tables for the final valuation. The national accounts framework maintains the identity of transactions. One of these is on the supply and demand of goods and services. This identity equates the value of the supply of goods and services to the demand of such good and services.

Following the supply and demand equation, qif the production of household own – account services were to be imputed, the same value of the household services should be recorded in consumption expenditure on the demand side. To maintain the existing practice in national accounts compilation, the value of output of domestic and personal services for own consumption would be equal to the value of final consumption of those services.

***Data Sources**:* The data needed for compiling the input-output tables will be (1) household time use surveys (for labour inputs and outputs) – with additional information on outputs, (2) household expenditure surveys – for household expenditure on raw materials, capital goods etc, and (3) supplementary information on the relevant prices and wages (for example, the prices of meals, child care etc). ` Like the input- output tables of the SNA, the household input-output tables present the activity structure of the household sector of the economy and present the uses of intermediate commodities, labour and capital in each type of productive activity undertaken by the households by unpaid labour and own capital. Thus household input- output tables can form the basis of a set of accounts for the ESNA activities of households.

Not many countries have produced satellite accounts for household unpaid services. Germany was perhaps the first country to produce such accounts (Goldschmdt – Clermont and Pagnossin – Aligisakis 1995). Australia, the Eurostat and some Eruostat countries individually, United Kingdom etc have complied such accounts. These accounts have shown that the value of ESNA is comparable with the value of the GDP. For example, in the case of Australia (1992) the value of ESNA was $ 341 m. as against the SNA value of $ 362 m! Clearly, there are strong reasons for valuation of the unpaid service sector.

It needs to be added that there is a scope for improving the methodology of compiling satellite accounts. For example, the methodology for valuing labour inputs can be improved by adding the concept of human capital; the relevant wages can be selected more accurately; outputs can be categorized systematically based on their characteristics; suitable prices can be found by undertaking suitable exercises and so on. There is also a need for evolving standardized concepts and methods at the global level. In short, a lot is to be done to produce systematic sophisticated input – output tables for unpaid work.

National Time Accounts

National time accounts is a newly emerging measurement of time use that presents a comprehensive view of the total economy or rather total society. National time accounts are basically a set of estimates of the total income and expenditure of time, similar to the estimates of national income and expenditure, which account for the national market transactions in monetary units. (Ironmonger 2003). National time accounts provide information on how individuals, households and the nation allocate their time between paid (SNA) work, unpaid (ESNA) work and personal services including leisure.

One basic advantage of national time accounts is that they compare apples with apples (i.e. compare time units) and avoid the controversial valuation. There is therefore good amount of cross country and over time comparability of these data. For example, one can easily compare the time spent on work or on leisure across the countries like the USA, Europe and Asia! What is needed for cross-country comparability is standard categorization of the major activities for paid, unpaid and other activities. National time accounts therefore can be easily adopted by all those countries who have conducted and who are willing to conduct time use surveys on a regular basis.

Several industrialized countries like Netherlands, Canada, Australia and OECD countries produce national time accounts. The Australian Bureau of Statistics, Statistics Canada and National Accounts Division of Statistics Netherlands have established a comprehensive framework for regular estimates of all work. (Ironmonger 2003).

Since national time accounts provide a comprehensive picture of the time use pattern of an economy and a society, it has several advantages in terms of understanding the different dimensions of the socio economic life of people.

- When continuous time accounts are available, they throw light on the dynamics of the changes that are taking place in the country. For example, the accounts can show whether paid work is declining, unpaid work is increasing or what is happening to the leisure.

- The accounts can throw light on the changing relationship between paid and unpaid work for men and women. A cross-country comparison can also help in understanding the difference in the shares paid and unpaid activates in different countries, as cross-country comparability of these account can be fairly good.

- These data can also help in understanding the household economy better by throwing light on how the households allocate their time or paid and unpaid work and on other activities among its different members.

- Natural time accounts can also be useful in understanding various socio cultural aspects of a society, like the time people spend on festivals, sports, entertainment, education and self study etc.

- National time accounts can greatly improve the modeling of our economic and social system and the interactions between the market and the household sectors of the economy.

Structure of National Time Accounts:

What could be the structure of national time accounts? Some work on this has already been done by some industrialized countries as mentioned above. In order to lend improved cross country comparability to these natural accounts, Ironmonger (2003) has proposed a structure for these accounts. According to this structure, the time use activities are divided into five major categories: (1) economic activities, (2) household work, (3) education, (4) leisure and (5) sleep and personal case. Each of these categories is further divided into sub-categories, the total number being 30, excluding travel. The columns of the accounts include categories of population, namely household population, other population and total population.[7]

It appears that the structure recommended by Ironmonger is based on the structure of the classification of time use activities as adopted by many countries. This classification largely depends on the SNA framework; i.e. the broad groups are SNA, ESNA and NSNA activities. Though one agrees with the approach of using the structure of the time use activity classification in compiling natural time accounts, in the light of the fact that we have not yet been able to arrive at a global classification for time use activities. This structure of the time accounts cannot be treated as final. In this context, we would like to mention that the expert committee on classification on time use activities, the basic structure of which can be useful at the global level.[8] It will not be out of place here to mention that there is an urgent need to finalize a global classification for time use activities.

There is also a need to do further work on developing major indicators and indices / ratios to enhance the use of national time accounts. Such indicators and indices can be computed in each country to enhance cross-country comparability of time use data.

- Per capita or average time use measures, such as per capita time allocation pattern, per capita time spent on economic work or on unpaid work or on leisure, per capita time spent on education, skill training and studies etc.

- Distribution of the time use across different socio-economic groups, such as measurements of inequalities of the distribution of leisure, or the time spent on paid work / unpaid work across gender, age groups, income levels etc.

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[7] The appendix to the above mentioned paper by Ironmonger (2003) presents this structure.

[8] As a member of this committee, the present author was in charge of preparing a draft time use activity classification

- Distribution of the time use across different sub national regions, rural and urban areas, in remote and backward areas etc.

- Measurement of changing pattern of the national time use in terms of the ratios of paid work to total work, leisure to total time etc.

In short, there is good scope for developing time use indications and indices based on national time accounts.

While concluding this discussion, it needs to be mentioned that the goal of developing national time accounts is still very distant. To start with, not many countries conduct regular time use surveys, and those who conduct regular time use surveys conduct them irregularly. For example, Norway conducts time use surveys at the interval of ten years (it conducted surveys in 1970, 1980, 990, 2000); Canada has conducted time use surveys at the interval of six years (it conducted the survey in 1981,1986 1992 and 1998); and Australia has conducted time use surveys in 1987, 1992 and 1997. It is only the USA, which has started monthly time use surveys recently. In the case of developing countries most countries (Such as India, Thailand, Mongolia, Lao PDR Benin, Madagarkar, South Africa, Morocco, Brazil etc) have conducted only one survey each so far. The ECA (Economic Commission on Africa) however is proposing continuous household surveys in African Countries – which is a positive development. In short, the simple looking goal of national time accounts is still quite distant.

Developing Social Indicators Based on Time Use Data.

Several social indicators can be developed using time use data in the areas of time poverty and time stress, human welfare and human development. Some efforts have already been made in this area. Some of the social indicators that can be developed are listed below by way of illustration:

- Time poverty or Time stress:(1) leisure time as a percentage to the total time (2) the time spent on total work as a percentage to the total time (3) the time spent on multiple tasks (work) as a percentage to the total time and (4) the time spent on sleep and rest as a percentage to the total time,(5) the time spent on drudgeries as a percentage to the total time .

- Human Development: (1) the time spent on education, training, studies as percentage to total time, (2) the time spent on voluntary work as a percentage to the total time, (3) poverty indicators of time use, such as the time spent on unpaid work as a percentage to the total time etc.

- Measures of Gender Inequalities and Gender Development: (1) the ratio of the time spent on total work by men and women, (2) the ratio of the time spent on unpaid work by men and women, (3) the ratio of the leisure time spent by men and women and so on.

Since not much conceptual and empirical work done in this area, a lot needs to be done to tap this potential of time use data.

Concluding Observations

The time use data, which provide a comprehensive picture of the economy and the society, have immense possibilities in terms of different types of measurements of the economy and the society. Only a few possibilities have been tapped so far, but most of the possibilities still remain untapped.

The major possibilities discussed here are pertaining to improving the estimates of the work force and of the national GDP, valuation of unpaid ESNA work, national time accounts and developing social indicators based on time use data. This is not an exhaustive list, and many more measurements can be developed from the available data.

There are, however, several conceptual and methodological problems, which need to be resolved carefully: Firstly, there is a need to develop sound concepts and methods for systematic collection of time use data. Development of global concepts and methods, including global classification of time use activities will enhance the strength as well as cross-country comparability of time use data. Secondly, there is also a need to understand the potential uses of time use data i.e. what they can do and what they cannot do. The importance of developing sound methodologies for the use of time use data in improving national GDP, in understanding workforce characteristics, in preparing national time accounts and satellite accounts etc can not be over emphasized. The present status of methodology is very fluid, and a lot is to be done to standardize relevant concepts and methods. Thirdly, capacity building and preparation of training material / guidebook etc is another area that needs to be strengthened. Fourthly, research on time use methods and concepts as well as analysis of time use statistics will strengthen this unique survey method considerably. Empirical studies on the impact of the different macro policies on paid and unpaid work will be useful in this context. And lastly networking on time use research is needed urgently. The available networks primarily serve the interests of industrialized countries, with the result that there is limited networking among developing countries. The UNSD, the ILO or the UNDP can take a lead in promoting networking of developing countries as well as of developed and developing countries.

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