

**Economic Evaluation of Unpaid Work  
in Republic of Korea**

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**Kim Tae-Hong**  
**(Senior Fellow in KWD)**

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## **I. Introduction**

### **A. Purpose of Study**

The economic evaluation of housework provided by women have been an issue of controversy since long ago. The methodology for evaluating the value of work provided by full time housewives was first discussed by Mitchell in 1919 (O. Hawrylyshyn;1976). Since then, many scholars have evaluated unpaid work, including work performed by full time housewives. Such studies and evaluations were mostly conducted by economists for the purpose of coming up with measures that could complement the value of housekeeping work left out of GNP.<sup>1)</sup>

These approaches started to take on a new form from the 1970s. The UN designated 1975 as the first International Women's Year, and in the same year, the World Code of Conduct was adopted in Mexico City. In the World Code of Conduct, women activists began their efforts to have the value of housekeeping work included in the SNA(L.BENERIA; 19999). Against this backdrop, from 1975, many studies were conducted and international conferences were held on the efforts to evaluate the economic value of unpaid work provided by full time housewives. In particular, the Office of Women's Affairs, the government body that dealt with women issues in Korea, started conducting studies and policy conferences on ways to reflect the value of housekeeping work in insurance programs and tax programs since 1990. In 1997, Korea and the UNDP jointly held an international conference on ways to incorporate unpaid work in national policy. Such studies lay the foundation that enables housekeeping work provided by housewives to be evaluated fairly in the event of accidents, in social security programs, or in legal systems, and at the same time, endeavor to incorporate the value of housekeeping work into the SNA.

Due to the policy and academic significance that economic evaluation of unpaid work bears, there have been many studies on this area from quite a long time ago in Korea as well. However, most of these studies were based on small samples, and thus had limitations in becoming generalized. Since the international conference held in Korea in 1997, the National Statistical Office(NSO) conducted a nationwide Time Use Survey in 1999. Using the raw data of NSO's Time Use Survey, this study aims to evaluate the Korean people's status of time use and the economic value of unpaid

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<sup>1)</sup> Economists Nord-haus & Tobin proposed the use of MEW (Measure of Economic Welfare), a comprehensive index complementing the conventional GNP. MEW includes capital service, leisure, non-market work, and imputed value to the conventional GNP concepts, and deducts the displeasures caused

work. The purpose of this study and the use of its results can be summarized as follows.

First, by incorporating the economic value of unpaid work in GDP, we aim to accurately understand the status of welfare in Korea, and by incorporating such results in national policy, improve policy efficiency. The current GDP does not include economic value produced from unpaid work, hence an inaccurate presentation of national welfare. Furthermore, as production activities in the household sector, such as production of basic subsistence goods, investments in child education, and volunteering are not clearly visible in economic terms, such investments and production activities are not accurately identified in the statistics that are used for establishing and implementing national policies, leading to high possibility for distortion and inefficiency of policy. Thus, this study suggests measures to evaluate the value of unpaid work, including house work, and measures to incorporate such value in the SNA, in order to solve the GDP-related concerns and to reflect unpaid work in national policy.

## **B. Overview of Time Use Survey**

The Time Allocation Survey was initially started by the Korean Broadcasting System (KBS) in the 1980s. Despite its importance, however, the KBS survey proved limited in its scope of utilization as its main purpose was to determine TV viewing patterns. Realizing such limitation, the Korea National Statistical Office (NSO) designed a new type of survey that went into full usage in 1999. The survey was conducted in the month of September 1999.

By conducting a survey on how Koreans use their 24hours on any given day, the average life style and quality of life can be understood, and the results can be used as basic reference material in devising ways to improve efficient use of the given time resource. The first survey was conducted in 1999, and following surveys are slated to be conducted every 5 years.

Responding households were asked to keep a time-diary for two days during a ten day period between September 3 and 12. Respondents were those aged 10 or above from 17,000 households, totaling 46,109. The survey questions were composed of 'household-related items', including type of house, type of residence, and type of pre-school child care, 'personal items', including gender, age, education level, marital status, 'the respondent's status of economic activity', 'subjective feelings', and 'use of time'. Interviews were conducted for household and personal related items, and

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by urbanization, traffic congestion, noise, and environmental contamination.

respondents were asked to keep a time-diary for two days (48 hours) indicating how much time was spent on what kind of activity. In detail, the respondents were asked to state how long it took him/her to conduct a certain activity, what his/her major activity and concurrent activities were by 10 minute increments, and whether such activity was conducted in the house or out of the house. All behavior patterns were divided into 9 major categories, 51 intermediate categories, and 125 sub-categories. The responses were recorded by the respondents themselves every 30 minutes, with distinctions being made among weekdays, Saturdays, and Sundays to distinguish the patterns according to the day of the week.

### **C. Classification of Activity**

Before going into economic evaluations of unpaid work conducted by Korean men and women, let us first look at the level of contribution made by men and women on the work hours. To this end, this study classified a person's activity as personal activity (non-economic activity) and productive activity (economic activity). In general, such a classification is based on the third-person rule. That is, 'whether a certain activity may be delegated to a third person'. If an activity may be delegated, it is productive activity, if not, individual. For example, eating or sleeping are activities that cannot be performed by anyone other than the person him/herself, thus, this kind of activity is classified as personal activity. Of course, there are activities of controversy when applying the third-person principle. A case in point is travel. Transporting goods needed by the household or transporting family members is, according to the third-person principle, productive activity. However, transporting or traveling for the person him/herself cannot be substituted by a third person. For example, someone else cannot substitute the person him/herself when he/she is going to work. Despite such fact, traveling activity, including commuting, has to be classified as productive activity.

In this study, economic activity is then divided into SNA activity and non-SNA activity. According to the 1993 SNA, SNA activity includes productive activities traded on the market but also productive activities for one's own use. However, productive activities in the household sector, such as house maintenance and family care, and volunteer activities were not acknowledged as SNA activity. In some countries, learning or investments in education for self-development are included in unpaid work even though they are household-sector activity, because they are regarded as potential for

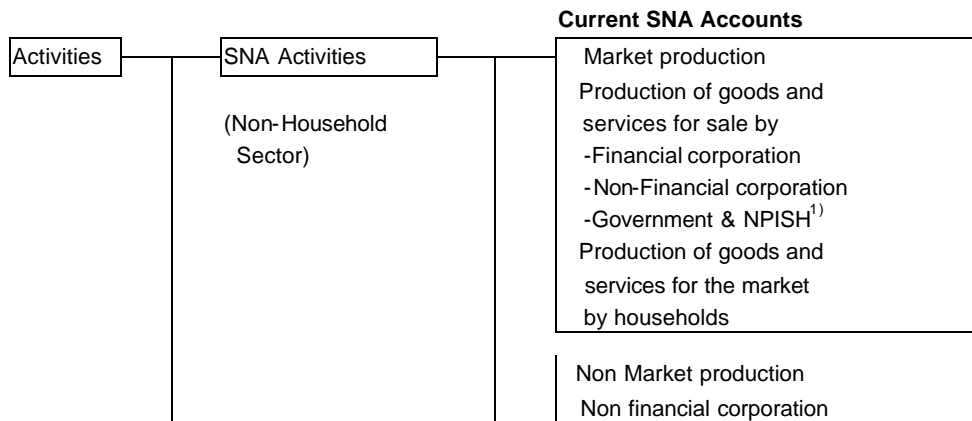
obtaining future income, a potential for producing domestic capital.<sup>1)</sup>

Based on such classification, all the activities surveyed in the Time Use Survey can be classified as follows; SNA activity, Productive activity conducted in the household that is non-SNA but needs to be included in a satellite account in the future, and Non-productive activity that is Non-SNA and does not need to be included in any satellite account(<Figure I-1> ).

Activities surveyed in the 1999 Time Use Survey in Korea are classified into 9 one-digit classifications, 51 two-digit classifications, and 125 three-digit classifications. This study, in order to identify men's and women's level of contribution to production based on the work hours, activities were classified into 125 three-digit classifications based on the criteria mentioned above.

In the Korea Time Use Survey, travel is classified according to the relevant activity. If the travel hour or travel is related to productive activity, the travel itself is classified as productive activity. Some countries regard religion and politics related activity as volunteer activity and include them in unpaid work. However, in this study, these activities were not included in unpaid work.<sup>1)</sup> Learning activities performed in the house for self-development were not included in the Non-SNA productive activity, because it is difficult to distinguish it from the general learning activity.

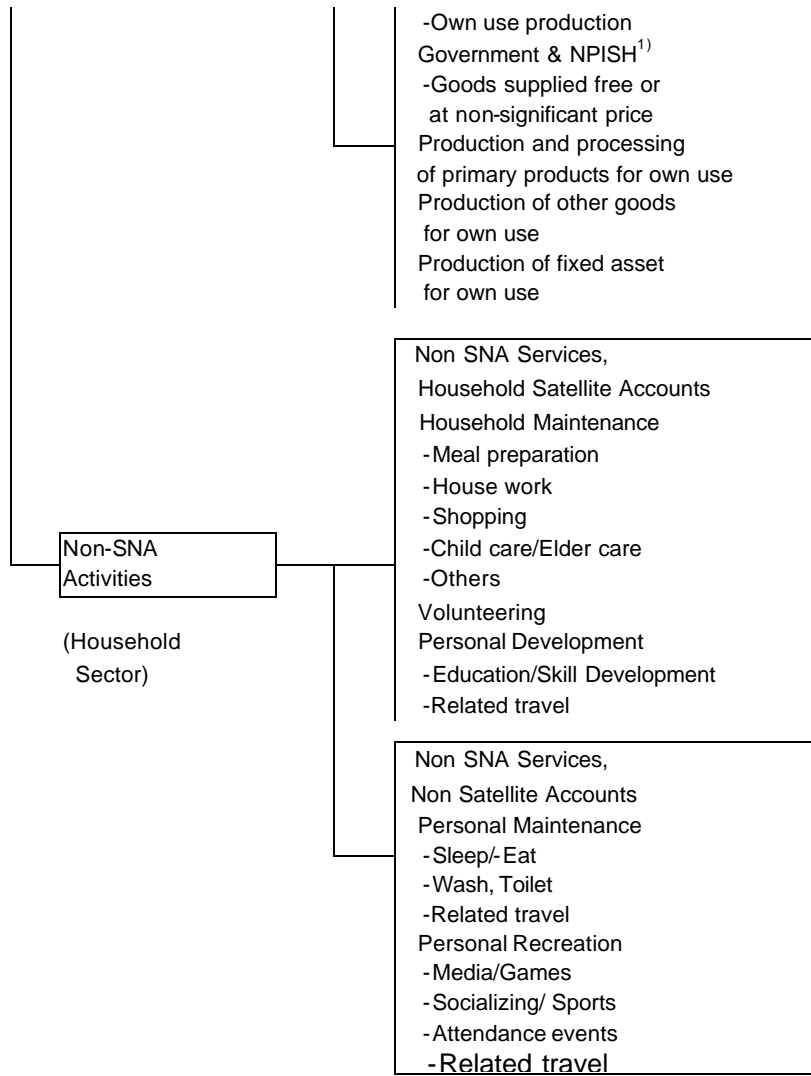
<Figure I-1> Classification of Activities based on SNA



<sup>1)</sup> Economists Nordhaus & Tobin proposed the use of MEW (Measure of Economic Welfare), a comprehensive index complementing the conventional GNP. MEW includes capital service, leisure, non-market work, and imputed value to the conventional GNP concepts, and deducts the displeasures caused by urbanization, traffic congestion, noise, and environmental contamination.

<sup>2)</sup> UNDP(1995), p. 89, M. Acharya(1997), pp. 304-343, L. Neuburger(1997).

<sup>2)</sup> S. Short(2001), Time Use Data in the Household Satellite Account-October 2000, Office of National Statistics.



Note: 1)NPISH: Non-profit Institutions serving Households

### D. Productive Work Hour of Men and Women

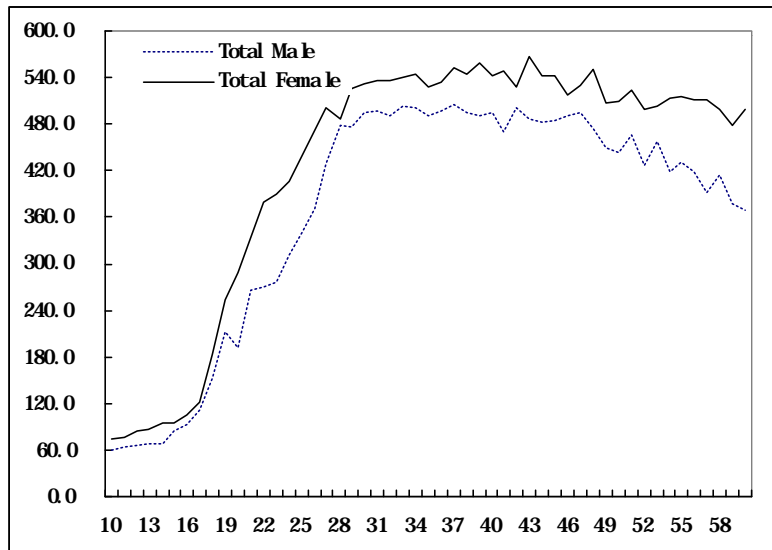
According to the analysis of the results of the Time Use Survey, respondents aged 10 and above spent an average of 6 hrs. and 27 min. a day in productive activity. By gender, men spent 5 hrs. 59 min. per day on productive activity, while women spent 6 hrs. 54 min. daily, which is approximately 1 hour longer than men, on productive activity. That is, women's productive work hour was nearly 1.5 times that of men's.

<Table I-1> Present Conditions and Ratio of Time Use per Day by Gender  
(Unit: Hours: Minutes, %)

	Males		Females		Total	
	Time	Ratio	Time	Ratio	Time	Ratio
Non-SNA	0:49	3.4	3:48	15.9	2:20	9.7
SNA	5:10	21.5	3:06	12.9	4:07	17.2
Personal Care	10:22	43.2	10:22	43.2	10:22	43.2
Study	1:41	7.0	1:22	5.7	1:31	6.3
Socializing, Leisure and Others	5:58	24.9	5:22	22.3	10:40	23.5
Total Productive Activity	5:59	24.9	6:54	28.8	6:27	26.9
Total Time	24:00	100.0	24:00	100.0	24:00	100.0

<Table I-1> shows productive work hours spent by men and women according to the age group. The general trend shows that in all age groups, women spend more time on productive activity than do men. That is, women do more productive work than men throughout their lives. In particular, when you look at the changes in the productive work hours of men and women by age group, women continue to spend, on average, 8~9 hrs. a day on productive work until she reaches the age of 60. More specifically, women, in her teens, spend, on average, 1 hour a day on productive work.

<Figure I-2> Changes in Productive Work Hours by Age  
(Unit:Minutes)



The number of hours grow rapidly in the twenties, and from thirties, which is the time a considerable number of women join the labor market to perform economic activity or get married and take charge of housekeeping and child care, they spend, on average, 8~9 hrs. on productive work. The average 9 hours of productive work per day continues until their early 50s. After 50, employed women, who used to do paid work, begin to retire, and the load of housework is reduced with the marriage of children. However, women still spent 8 hours per day on productive activity until 60.

In comparison, men's productive working hour also grew rapidly after the age of 20. And around their 30s, their productive work hours peaked at an average 8~9 hrs. a day. Such a trend continues until their mid 40s. However, after mid 40s, the productive work hours decrease rapidly and when they reach 60, the hours are reduced to 6 hrs. a day.

When Korean men's and women's productive work hours are compared with those of other advanced countries, men's productive work hours are relatively shorter than that of other foreign men's. Such a difference could well have been derived from the difference in the definition of productive activity; some countries, including the UK, include political or religious activity in unpaid work and other countries include activities not related to production. However, even taking into consideration such difference in the definition, Korean men's productive work hours still fall short of the number of hours spent by men in other countries. Meanwhile, women's productive work hours were revealed to be lower than Italy (7 hrs. 50 min.), the US (7hrs. 33min.), and Denmark (7hrs. 29 min.), but higher than the Netherlands(5 hrs.58 min.), Japan (6 hrs. 38 min.), and similar to France or Finland. Although the result that not only Korean men but also Korean women spend shorter hours in productive activity compared to other countries warrants further study, it seems to be closely related to the short productive work hours spent by Korean population aged between 10 and 25. The relatively short productive work hours spent by Korean youths can be accounted for by the long hours they spend in learning(studying).<sup>1)</sup>

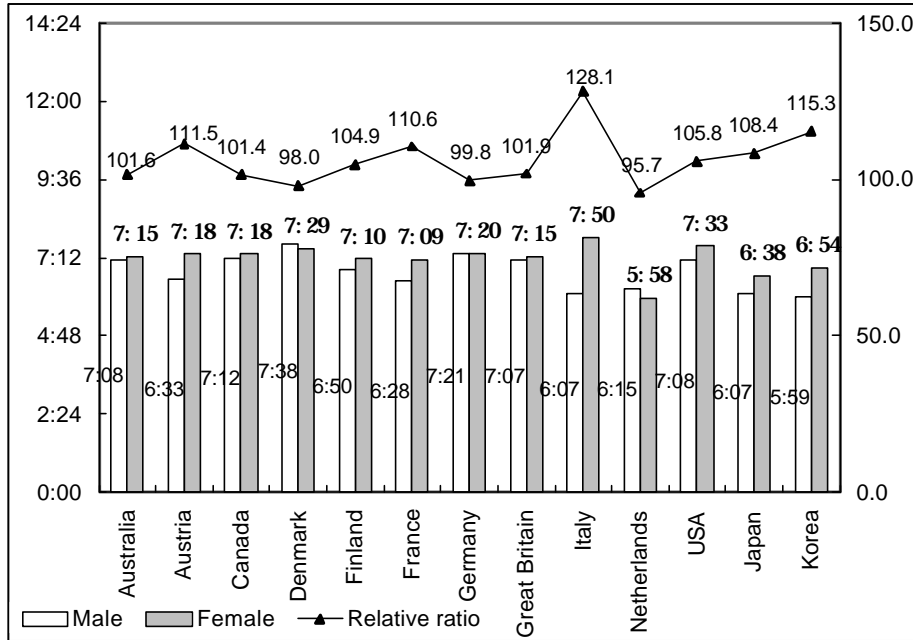
An international comparison of daily learning hours of (unmarried) students aged 15-24 shows that the average for Korea is 7 hrs. 16 min. per day. By gender, male students spend 7 hrs. 23 min. per day on average, while female students spend 7 hrs. 8 min. However, Canadian male and female students of similar age groups spend 5 hrs. 7 min. and 5 hrs. 11 min., respectively (1992), Austrian students spend 4 hrs. 47 min. and 4 hrs. 39 min., respectively (1992), Italian students spend 3 hrs. 50 min. and 3 hrs.

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<sup>3)</sup> The economic activity participation rate for Koreans aged 15-19 are 10.6%, and 11.8%, respectively NSO (2000), 'Economically Active Population Annal'

53 min., respectively (1988/9), and Finland students spend 3 hrs. 40 min. and 2 hrs. 18 min., respectively (1987).<sup>1)</sup> It is highly likely that such long learning hours spent by Korean youths decreased Korea's average productive work hours.<sup>1)</sup>

<Figure I-3> International Comparative of Productive Work Hours by Gender  
(Unit: Hours, Men's Hour=100)



Note: relative ratio is 'women's productive times/men's productive times×100'.

Source:L. Goldschmidt-Clermont, E. Pagnossin-Aligisakis(1995),

Australia: How Australians Use Their Time(1997). Canada: Statistics Canada(1998).

Japan: Economic Research Institute Economic Planning Agency(1999).

Netherlands(1997), Social and Cultural Survey.

U.K.:Office of National Statistics(2001)

4)A. H. Gautier, F. F. Furstenberg(1999), Table 5.

5) In order to verify such possibility, the population need to be categorized by gender and the number of population and time use pattern for each group need to be compared between countries. As shown in the formula below, the time use per population need to be de-composed and the percentage of time for each activity and the number of population need to be verified. TE in Formula (1) refers to the total productive work hours, r refers to how the daily productive hours are composed, n refers to population, letter m and f refer to male and female, and letters l and j refer to the age group and specific activity.  $TE = \sum_l \sum_j TU_j^m \times r_j^m + \sum_l \sum_j TU_j^f \times r_j^f \times n_j^f$  (1)

Comparing the difference between men's productive work hours and women's productive work hours, countries excluding Australia, the Netherlands, Denmark and Germany showed that women spent more hours on productive activity than did men. In particular, Korea, along with Italy, Austria, and France showed that women spend far more time on productive work than do men.

### E. SNA, Non-SNA Work Hours

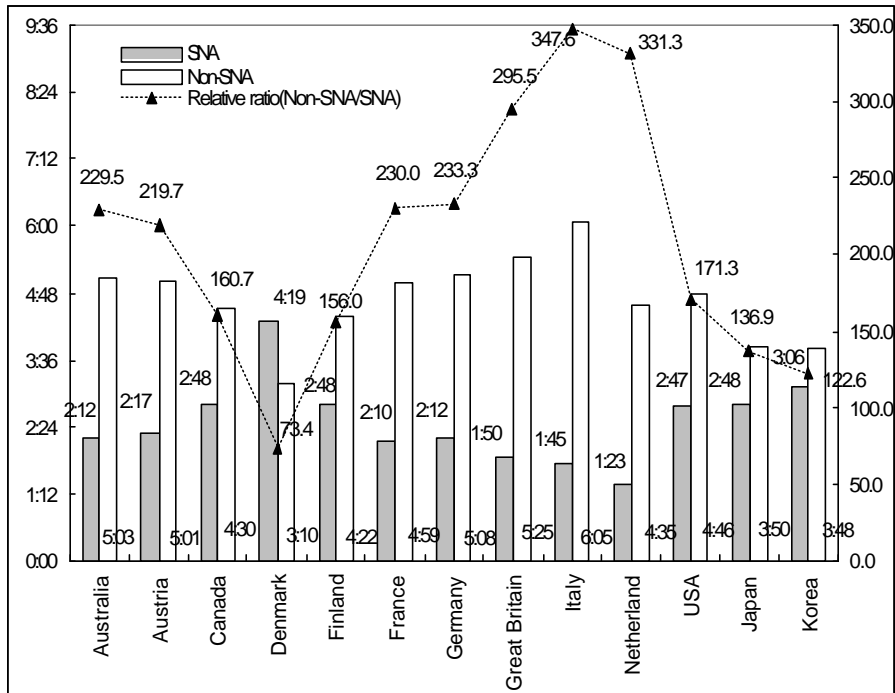
Dividing time spent in productive activity into time in SNA activities and time in non-SNA activities, we can see that Koreans spend, on average, 6 hrs. 27 min. per day on economic activity. Of the 6 hrs. 27 min., 4 hrs. 7min. is spent on paid work and 2 hrs. 20 min. on unpaid work.

<Table I-2> Ratio of Productive Activity by Gender (Unit: Hours: Minutes, %)

	Males		Females		Total	
	Time	Ratio	Time	Ratio	Time	Ratio
Non SNA	0:49	13.6	3:48	55.2	2:20	36.1
SNA	5:10	86.4	3:06	44.8	4:07	63.9
Total Productive Activity	5:59	100.0	6:54	100.0	6:27	100.0

Looking at this by gender, we can see that men spend, on average, 5 hrs. 10 min. per day on paid work and 49 min. on unpaid work. Korean men spend more time on unpaid work than do Japanese men (31 min.) However, this is far less than what is spent by men in other advanced countries for unpaid work; UK men spend 3hrs. 54 min. (1999), Dutch men 2 hrs. 37 min. (1995), Australian men 2hrs. 47 min. (1997), Canadian men 2hrs. 42 min. (1999) Breaking down women's time spent on productive activity into paid and unpaid work, we see that Korean women, on average, spend 3 hrs. 6 min. per day on paid work while 3hrs. 48 min. is spent for unpaid work. Korean women spent more time on paid work than did Danish women, but less time on unpaid work compared to Australian women. When women's paid work and unpaid work was compared, the relative percentage of unpaid work (unpaid work/paid work  $\times$ 100) was highest for Italy, followed by the US, and the UK. Women in these countries spent three times as more on unpaid work than on paid work. Compared to this, Korean women spent 1.2 times the time spent on paid work, 0.7 times for Danish women, 1.3 times for Japanese women, and 1.6 times for Canadian women.

<Figure I-4> International Comparative of Women SNA & Non-SNA Work Hours  
(Unit: Hours)



Source: Same with <Figure I-3>.

## II. Economic evaluation of unpaid work

### A. Types and Characteristics of Economic Evaluation Methods

There are two ways to evaluate unpaid work; by volumes and by values. Then, volume can again be categorized into input volume and output volume.<sup>1)</sup>(<Table II-1>). The volume-oriented method evaluates unpaid productive activity by either the volume of input or the volume of output, This method, including both input and output approaches, is based on physical units, such as the number of employees (or work hours), or the number of people cared for (or hours), etc. Evaluation can be conducted by comparing the market sectors and non-market sectors but only when the physical

<sup>6)</sup> Papers that evaluate the economic value of unpaid work using various methods refer to L. Goldschmidt-Clermont (1985), Appendix Summaries of Unpaid Work Evaluations (pp.41-26)

units are similar. Thus, the volume-oriented method would have its limits in evaluating unpaid productive activity.

#### 1) Input Approach

There are two types, input and output approach, to value-oriented method as well. The input approach evaluates the value by multiplying the appropriate wage rate to the input hours spent in unpaid productive activity. The input approach can be further categorized as follows according to the wage rate used.

Opportunity cost approach (OCA): The OCA is based on the assumption that a reasonable economic subject would perform unpaid work until the marginal value of unpaid work is equal to the market wage. Based on this assumption, the market average wage is applied. There are some limitations to the OCA. That is, if a woman has to stay home not because of a reasonable decision that her staying home is a reasonable allocation of time, but because of social custom, the principle that the value of unpaid work is equal to market wage cannot be applied. Moreover, if the marginal value of unpaid work decreases with time, the marginal value of unpaid work becomes lower than the average value. But since the market wage rate reflects the marginal value of unpaid work, the total value of unpaid work computed using the market wage rate would be an under-evaluation of the actual value of the unpaid work. Lastly, if the OCA is applied, the economic value of the same unpaid work could result in different results depending on the person that performed the unpaid work.<sup>1)</sup>

Market cost approach (MCA): The MCA uses the wage that would have to be provided if the person performing the unpaid wage had to be substituted to a paid worker. This method can be broken down into two methods. The first method, Specialist Method (MCA-1), uses the potential wage of specialized producers that would be hired to perform the detailed activities of unpaid work (Individual function costs). The second method, Generalist Method (MCA-2) uses the wage of a housekeeper that would be hired to perform the general housekeeping work (Housekeeper costs). In general, specialists have several years of experience and use special equipment or facility. Thus, they are more productive than the family member, hence the high wage. Because of this reason, many researchers argue that housekeeper costs need to be used when evaluating the economic value of unpaid

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<sup>1)</sup>M. A. Ferber, B. G. Bimbaum(1980), *Homework: Piceless or Valueless*, *Review of Income and Wealth*, pp. 387-400.

work. Moreover, some researchers argue that the wage rate used to evaluate the economic value of unpaid work must be the potential wage rate less tax and social security costs. However, according to the 1993 SNA, wage rate before income tax and social security cost deduction is encouraged when using the input approach to evaluate the economic value of unpaid work.

In the input approach, the results of the Time Use Survey is used to evaluate unpaid work. However, when using the Time Use Survey, there are some limitations inherent in the survey of unpaid work to consider; the Time Use Survey does not provide information on the efficiency or productivity of the worker and only provides information on the hours spent on various activities. Thus, this kind of data does not provide information needed to distinguish fast working workers to slow workers. The Time Use Survey does not provide information on the environment or risk associated to a certain activity. For example, meal preparation in a conventional kitchen and meal preparation in a modern style kitchen is not distinguished. A household does not allocate time according to the profitability or productivity of time. Time is often allocated to one activity, either because there is no other activity to perform or because the household does not provide better technology. As a result, diminishing return for work is ignored. The input approach is based on the assumption that even if all full time housewives participated in paid work and provided additional work, the market wage rate would not change. However, it is true that in reality, when a full time housewife does provide additional work to the market, the existing market wage rate would be decreased. Moreover, the economic subject that performs unpaid work is making a decision between paid work and unpaid housework, and thus, the time they spend bears economic value.

## 2) Output Approach

The output approach associates value to household production. In this case, the value of intermediate goods is deducted from the total value added and all tax related to consumption of fixed cost and production need to be deducted. In most economies, the SNA is based on the output approach. That is, gross national product is computed based on the output of goods and services. Thus, a comparable evaluation of unpaid work value need to be made in the output approach. In order to use this approach, the Time Use Survey would have to provide information on the output. However, most countries, including Korea, don't survey the output from unpaid work.

A summary of the advantages and disadvantages of the input approach and output approach is shown as in <Table II-1>

<Table II-1> Advantages and Disadvantages of Output Approach and Input Approach

	Input Approach	Output Approach
Advantages	<ul style="list-style-type: none"> <li>-Measure real output.</li> <li>-Products have wider market substitutes.</li> <li>-Compatible with the main body of SNA.</li> <li>-Reflects household productivity situations.</li> <li>-Overcomes the problems of measuring productivity of time of various individuals, simultaneous activity, and delineation of boundary between leisure and work.</li> </ul>	<ul style="list-style-type: none"> <li>-Simple and easier to handle</li> <li>-Requires less data once the time inputs are measured</li> <li>-may be the only possible method for service in some situations.</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>-Requires more data and effort.</li> <li>-Difficult to apply in the case of services where no comparable services exist in market.</li> <li>-Less experience available on this methodology.</li> </ul>	<ul style="list-style-type: none"> <li>-Measures input and no output.</li> <li>-Does not reflect the household's productivity situation.</li> <li>-Not compatible with general methodology of output measurement in SNA.</li> <li>-A choice required among multiple wage rates.</li> <li>-Value will depend on the particular wage rate chosen and has been found to vary widely.</li> <li>-Problems of productivity of time of various individuals, simultaneous activities, boundary between work and leisure.</li> <li>-Require various assumptions for solution.</li> </ul>

Sources: M. Acharya(1997), Table 2, p. 329.

## B. Economic Evaluation Method

As mentioned above, the two major methods of evaluating the value of unpaid work is MCA and OCA. And MCA is broken down into a Generalist method and a Specialist method. In this study, in consideration of the data available, the three methods falling under input approach is used for the economic evaluation of unpaid

work.

Opportunity cost approach (OCA): OCA computes the wage lost from performing unpaid work, in order to measure the value of unpaid work. The computation is done as shown in formula (3); the subject performing unpaid work is classified by gender, age group, and education level, and the daily hours spent on unpaid work per person (Hup) is multiplied by the average wage rate and the population. This method is based on not the activity but the individual. Thus, the evaluation result differs depending on how the group that participated in unpaid work is selected. In this study, the population was categorized into one group of less than 20, 5 year incremental groups for ages between 20 and 39, and one group each for 40s, 50s and 60 and above. In light of the fact that the wage level differs considerably according to education level, the population was categorized into high school graduates and below and college graduates and above.

$$EV = Hup_{ijk} \times HW_{ijk} \times P_{ijk} \quad (1)$$

EV : economic value, Hup: hours unpaid, HW: hourly wage,

P: number of population.

letters i, j, k refer to sex, age, and education level, respectively

Specialist method (Individual function costs; MCA-1): As mentioned above, the specialist method specifies unpaid work into detailed activities, measures time spent on each activity, and uses the hourly wage that would have been paid for the individual work to derive the total value.

In detail, the number of hours spent on the individual unpaid work, which is indicated by the letter a, is multiplied by the hourly wage of the worker that performed the specific task for unpaid work a, and the total population. The formula is as shown in (2). The letter a refers to the type of unpaid activity concerned.

$$EV = Hup_a \times HW_a \times P \quad (2)$$

EV : economic value, Hup: hours unpaid, HW: hourly wage, P:population.

This study used the data from the 'Time Use Survey' conducted by the NSO. The activity classification system used for NSO's Time Use Survey is comprised of 9 one-digit classifications, 51 two-digit classifications, and 125 three-digit classifications. And the 9 one-digit classifications are broken down into essential hours (sleeping, eating,

washing & make-up, personal hygiene), duty hours(work, housework, family care, learning and travel), and leisure hours (socializing and leisure activity). Compared with the activities used in the NSO Time Use Survey that are used to evaluate the value of unpaid work, the jobs performed by paid workers, as classified by the Korea Standard Job Classification, that show similar characteristics were chosen. These jobs are as shown in <Table II-2>. As shown in <Table II-2>, wage statistics are available only up to three-digit classifications. Thus, in the event the job corresponding to the unpaid activity falls under a detailed classification(5-digit classification), the wage for the three-digit classification job that includes the job concerned was used in its place. This kind of application naturally entails limitations due to the non-reflection of difference in wage derived from the difference in the characteristic of the job (between the three-digit classification and the detailed detailed classification), and measurement errors. Such measurement errors can only be solved by increasing the number of samples or by conducting a special wage survey on those jobs that correspond to the unpaid work activity.

Generalist method (Housekeeper costs; MCA-2): The generalist method regards unpaid work as a job, and assuming that a household hires one worker corresponding to the job concerned, the income of that particular worker is used to evaluate the value of the unpaid work. As shown in formula (3), the daily average hours spent in unpaid work (Hup) is multiplied with the hourly wage of the worker performing the work (HW)and with the population (P) to derive the total value. In this study, housekeeper pursuant to the Korea Standard Job Classification (Job code 51211) or housework or food service worker (Job code 512) will be used as the substitute worker corresponding to the unpaid work. The problem of measurement errors is still persistent in this method as well.

$$EV = Hup \times HW \times P \quad (4)$$

### **C. Result of Economic Evaluation of Unpaid Work**

The results of evaluating the unpaid work hours in Korea based on the three methods mentioned above are as follows.

<Table II-2> in file 'Table 2'



### 1) OCA

Using the raw data of 'Time Use Survey' of the NSO, unpaid work hours were computed by gender, age group, and by education level. In addition, the raw data of the Labor Ministry's 1999 Basic Survey of Wage Structure (2000) was used to compute the average wage of male and female workers according to age group and education level. The average wage level of workers was computed by dividing the annual special wage by 12 and adding the resulting figure to the total monthly wage. The average total wage, derived through such process, was divided by the monthly working hours (normal working hours + overtime hours) to compute the hourly rate.

The last data needed for the economic evaluation of unpaid work is to compute the population by sex, age group and by education level. The population was calculated using the 'Population Census' and 'Future Population Estimate' conducted in 1995. First, to calculate the male and female population aged 15 and above according to age group and education level, the raw data of 'Economically Active Population Survey' of the NSO was used. The 'Economically Active Population Survey' adjusts the population aged 15 and above each year using the 'Population Census' and 'Future Population Estimate'.<sup>1)</sup> As for the male and female population by age group for those aged between 10-14, the 'Future Population Estimate' of the NSO (1996) was used.

This study used various methods to conduct economic evaluation of unpaid work. First, as was done in Japan, unpaid work was analyzed according to age group only (OCA-1), secondly, according to age group and education level (OCA-2), and lastly, by applying men's wage to women's unpaid work(OCA-3). In the last method, men's wage was used because applying women's wage to women's unpaid work would have reflected the gender difference in wage in the labor market in the economic evaluation of unpaid work, resulting in under-evaluation of the value of unpaid work.

The total economic value of unpaid work evaluated in this manner amounted to approximately an annual 190 trillion won. This figure equals 40% of Korea's GDP. This means that each year, nearly 4 million won per capita (330,000 won monthly) worth of unpaid work is performed in Korea. And 80% of such unpaid work is performed by women. Moreover, when the value of unpaid work is compared with annual compensation received by Korean employees for performing paid work, the value of unpaid work takes of 90% of the compensation for paid work received by Korean employees.

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<sup>8)</sup> NSO 2000, 'Economically Active Population Annal' p.3

&lt;Table II-2&gt; Comparative in Total Economic Value of Unpaid Work and GDP (OCA Method)

	OCA-1	OCA-2	OCA-3
Total economic value of unpaid work (C=A+B)	187 trillion 20 billion won	177 trillion 5,731 billion won	256 trillion 8,190 billion won
- Economic value of unpaid work performed by a nation	3.99 million won annually (333,000 won monthly)	3.79 million won (316,000 won monthly)	5.48 million won (457,000 won monthly)
Total economic value of Women's unpaid work (A)	148 trillion 6,292 billion won	140 trillion 9,856 billion won	218 trillion 4,462 billion won
- Economic value of unpaid work performed by a female	6.40 million won annually (533,000 won monthly)	6.07 million won (506,000 won monthly)	9.40 million won (783,000 won monthly)
Total economic value of men's unpaid work (B)	38 trillion 3,728 billion won	36 trillion 5,876 billion won	38 trillion 3,728 billion won
- Economic value of unpaid work performed by a male	1.62 million won annually (135,000 won monthly)	1.55 million won (129,000 won monthly)	1.62 million won (135,000 won monthly)
Female contribution for total economic value of unpaid work (A/C×100)	79.5%	79.4%	85.1%
Relative rate for GDP (economic value of unpaid work/GDP×100)	38.7%	36.7%	53.1%
Relative rate for wage income (economic value of unpaid work/employee's pay×100)	89.6%	85.1%	123.1%

Note:1) As similar comparative time, GDP in 1999 is 483 trillion 7,778 billion won.

- 2) In estimation of economic value per one person, population is estimated using total population, not population performed unpaid work.
- 3) Source of population was used the Future Population Estimate of NSO(1996).

## 2) Specialist Method (MCA-1)

The total value of unpaid work evaluated according to the specialist method reached 153 trillion 822.6 billion won. By gender, the value of men's unpaid work amounted to 33 trillion 250.8 billion won, while women's value amounted to 120 trillion 571.8 billion won. This means that the value of unpaid work performed by women take

up 78.4% of the total value of unpaid work. Converted to per capita value, the result is 5.19 million won annually (432,000 won monthly)

<Table II-3> Comparative in Total Economic Value of Unpaid Work and GDP (MCA Method)

		MCA-1
Total economic value of unpaid work (C=A+B)		153 trillion 8,226 billion won
- Economic value of unpaid work performed by a nation		3.28 million won annually (274,000 won monthly)
	Total economic value of women's unpaid work (A)	120 trillion 5,718 billion won
	- Economic value of unpaid work performed by a female	5.18 million won annually (432,000 won monthly)
	Total economic value of men's unpaid work (B)	33 trillion 2,508 billion won
	- Economic value of unpaid work performed by a male	1.41 million won annually (117,000 won monthly)
	Female contribution for total economic value of unpaid work (A/C×100)	78.4%
	Relative rate for GDP (economic value of unpaid work/GDP×100)	31.8%
	Relative rate for wage income (economic value of unpaid work/employee's pay×100)	73.7%

The value derived from the MCA-1 method was slightly smaller than the value derived from the OCA method. The MCA-1 result shows the value of unpaid work taking up 31.8% of Korean GDP and 73.7% of the total compensation received by employees. By activity, the value for meal preparation amounted to 45 trillion 39.5 billion won, 23 trillion and 64.1 billion won for pre-school child care, 18 trillion and 823.1 billion won for cleaning, and 16 trillion and 598.5 billion won for spouse and family care. By gender, the value created by women for preparing meal amounted to 42 trillion 136.6 billion won, 18 trillion 89.3 billion won for pre-school child care, 15 trillion 116.9 billion won for cleaning, and 12 trillion and 400.4 billion won for spouse and family care. Meanwhile, the value for men's unpaid work was relatively smaller, with 4 trillion 974.8 billion won for pre-school child care, 4 trillion 198.1 billion won for spouse and family care, 3 trillion and 706.2 billion won for cleaning, and 2 trillion 902.8 billion won for meal preparation. Meanwhile, the economic value of men and women's volunteer activity was 1 trillion 924.5 billion won and 2 trillion 348.4 billion won, respectively.

Looking at the composition of unpaid work, household maintenance related value took up 67.1% of the total value, followed by 30.1% by family care and 2.8% by

volunteer activity. (<Table II-4>). Breaking this down by gender, we see that men and women both created similar amount of value for household maintenance, which amount to around 65%, followed by 30% for family care. However, men showed a higher value created by performing volunteer activities than did women. Comparing the values created by men and women for each activity ('women's value/men's value'×100), the values created by women for household maintenance and family care were 3.8 times and 3.6 times the values created by men, respectively. However, the value created by volunteer activity was 1.2 times the value created by men.

<Table II-4> Total Economic Value of Unpaid Work by Form of Activities (MCA-1 Method)

(Unit: hundred million won, %)

	Total		Males		Females	
	Value	Ratio	Ratio	Value	Ratio	Value
Household Care						
Food preparation	450,395	(29.3)	(1451.6)	29,028	(8.7)	421,366
Clothes care	98,623	(6.4)	(1696.1)	5,491	(1.7)	93,132
Cleaning and Arrangement	188,231	(12.2)	(407.9)	37,062	(11.1)	151,169
House upkeep	41,957	(2.7)	(53.6)	27,308	(8.2)	14,649
Purchasing goods	86,505	(5.6)	(326.3)	20,293	(6.1)	66,212
Household management	20,166	(1.3)	(209.8)	6,510	(2.0)	13,657
Other h'hold care activities	146,264	(9.5)	(68.0)	87,084	(26.2)	59,180
Subtotal	1,032,141	(67.1)	(385.1)	212,776	(64.0)	891,364
Family Care						
Care of preschool child	230,641	(15.0)	(363.6)	49,748	(15.0)	180,893
Care of school-age child	66,730	(4.3)	(662.0)	8,758	(2.6)	57,973
Care of spouse	165,985	(10.8)	(295.4)	41,981	(12.6)	124,004
Subtotal	463,357	(30.1)	(361.1)	100,487	(30.2)	362,870
Voluntary Services						
Voluntary services	42,729	(2.8)	(122.0)	19,245	(5.8)	23,484
Total	1,538,226	(100.0)	(362.6)	332,508	(100.0)	1,205,718

Note: Gender relative ratio indicates proportion of women's value for men's value, and is estimated by (women's value/men's value)×100.

The breakdown of values by specific activities that fall under household maintenance show that men created the largest value for household maintenance related travel, which amounted to 26.2%. This was followed by cleaning (11.1%), meal preparation (8.7%), and home maintenance (8.2%). In contrast, women created the highest value for meal preparation, which took up 34.9%, followed by cleaning (12.5%),

and clothes maintenance (7.7%). As for family care, the order was the same for both men and women, which was pre-school child care followed by spouse and family care, and then by school-children care.

3) Generalist Method (MCA-2)

The housekeeper was used as a substitute for the unpaid worker in the Generalist method to evaluate unpaid work, Housekeepers, according to the Korea Standard Job Classification, is coded 51211. However, in the raw data of 'Basic Study on Wage Structure' by the Ministry of Labor, it is coded 512. This material only provides wage on housekeeping and related workers. Housekeeping and related workers include not only housekeepers but also head cooks, cooks working in restaurants, head waiters, and general waiters working in restaurants. Thus, this study, taking in to consideration that most housekeepers are women, used the wage for women 'housekeeping and related workers' to evaluate unpaid work preformed by both men and women.

According to the Labor Ministry's data, the wage of women workers was 4,296.2 won.<sup>1)</sup> Using this wage, the economic value of unpaid work was calculated as shown in <Table IV-7>(EV = Hup×HW×P). When the wage of women housekeepers was used, the total evaluated value was 144 trillion 831.7 billion won. Such total value is lower than the value evaluated using the OCA method or Specialist Method. That is, the value of unpaid work evaluated based on the Generalist method shows unpaid work taking up 29.9% of GDP and 69.4% of compensation earned by paid workers. The value of women's unpaid work took up 82.9% of th total value. The economic value of unpaid work performed by one woman each year is 5.17 million won, and 1.05 million won for men.

<Table II-5> Comparative in Total Economic Value of Unpaid Work and GDP (MCA Method)

	MCA-2
Total economic value of unpaid work (C=A+B)	144 trillion 8,317 billion won
- Economic value of unpaid work	3.09 million won annually

<sup>9)</sup> When such hourly rate is converted according to 8 hrs. per day, the value is 34,370 won (as at 1999). Such wage value is higher than the standard daily rate of 25,000won used by YWCA when assigning housekeepers, but lower than the standard daily rate of 50,000 won used by private job assignment institutions in 2001. The value is similar to the standard rate of 34,360 won designated by the government (1999: unit price for regular worker). The government applies this rate for housekeepers as well.

performed by a nation	(258,000 won monthly)
Total economic value of women's unpaid work (A)	120 trillion 500 billion won
- Economic value of unpaid work performed by a female	5.17 million won annually (430,000 won monthly)
Total economic value of men's unpaid work (B)	24 trillion 7,817 billion won
- Economic value of unpaid work performed by a male	1.05 million won annually (87,000 won monthly)
Female contribution for total economic value of unpaid work (A/C×100)	82.9%
Relative rate for GDP (economic value of unpaid work/GDP×100)	29.9%
Relative rate for wage income (economic value of unpaid work/employee's pay×100)	69.4%

#### 4) International Comparison of the Value of Unpaid Work

Although the resulting value of unpaid work differed slightly according to the evaluation method used, the total value ranged from 144 trillion won to as much as 256 trillion won (<Table II-6>). Such value takes up roughly 30%-50% of Korea's GDP (483 trillion 777.8 billion won).

<Table II-6> Total Economic Value of Unpaid Work by Evaluation Method

	Males	Females	Total	
	economic value of unpaid work	economic value of unpaid work	economic value of unpaid work	proportion for GDP
OCA-1	38 trillion 3,728 billion won	148 trillion 6,292 billion won	187 trillion 20 billion won	38.7%
OCA-2	36 trillion 5,876 billion won	140 trillion 9,856 billion won	177 trillion 5,731 billion won	36.7%
OCA-3	38 trillion 3,728 billion won	218 trillion 4,462 billion won	256 trillion 8,190 billion won	53.1%
MCA-1	33 trillion 2,508 billion won	120 trillion 5,718 billion won	153 trillion 8,226 billion won	31.8%
MCA-2	24 trillion 7,817 billion won	120 trillion 500 billion won	144 trillion 8,317 billion won	29.9%

When this percentage is compared to the percentage of foreign countries, calculated by a similar formula, Korea's percentage is higher than Japan's but lower than other advanced countries'. First of all, Japan's value of unpaid work took up as small as 15.2% to as much as 23.2% of GDP. This is the lowest level indicated among

those countries that posted the estimated value of unpaid work in their countries. K. Oda, R. Sato(1997) cited one of the major causes for such result was that compared to other countries, Japanese people spent relatively less time on unpaid work vis-a-vis paid work. Such relatively short hours in unpaid work can be explained by the fact that travel, house maintenance, and gardening are not included in unpaid work and that Japanese survey is conducted only on those aged 15 and above.

Goldschmidt-Clermont, Pagnossin- Aligisakis(1995) provided a summary of the results from European and African countries. The economic values of unpaid work in Australia, Denmark, Finland, France, Germany, and Norway took up as small as 33% to as much as 72% of the GDP of their respective countries. And the average value among these 6 countries was marked at 43%  $\pm$  10% of GDP. Also, apart from Australia, the five other countries showed the economic value of unpaid work being lower than the compensation learned by paid workers. These 6 countries' economic value evaluated for unpaid work is higher than the value evaluated in Korea.

<Table II-7> Proportion of Economic Value of Unpaid Work in Other Countries for GDP

Country	Year	Researchers	Proportion of economic value for GDP		
			OCA	MCA-2	MCA-2
Denmark	1987	Bonke(1993)	-	37	-
Netherlands	1990	Bruyn-Hundt(1990)	108	82	-
Australia	1992	Castles(1992)	69	54	58
Canada	1992	Chandler(1994)	46.3	-	41.4
Norway	1992	Dahle/Kitterod(1992)	39	38	37
Austria	1992	Franz(1992)	138	-	-
Germany	1992	Schafer/Schwarz(1994)	63.0	44.0	46.0
New Zealand	1990	Statistics New Zealand(1992)	66	42	51
Finland	1990	Vihavainen(1995)	59	45	-
Swiss	1997	Sousa-Poza(1999)	49.40	41.11	52.30
Japan	1996	M. Fukami(1999)	23.2	15.2	20.0
Korea	1999		38.7	29.9	31.8

Note: 1) Opportunity cost approach is the case that applied pre-tax wage.

As shown in <Table II-7>, even when the results of advanced countries other than the six of Australia, Denmark, Finland, France, Germany, and Norway are considered, the percentage of unpaid work against GDP in Korea is relatively low than the percentage of advanced countries. The main reason for this is that Korean women spend long hours on paid work. That is, while women's hours spent on unpaid work is relatively shorter, their time spent on paid work is longer. According to the Economic Activity Participation Rate, which shows how many women aged 15 and above participate in economic activity, the rate for Korean women was 48.3% for 2000 which is lower than the figure for northern Europe (80%) or other advanced countries including the US (60~70%).

However, when the actual time spent on paid work is compared, Korean women spend, on average, 3hrs. 6 min. per day, which is longer than the US (2 hrs. 48 min.), Canada (2hrs. 48min.), or the UK (1 hr. 50 min.) According to these statistics, While the percentage of Korean women participating in economic activity is lower than advanced countries, the paid hours spent by employed Korean women were longer than women in other countries.

Another reason the value of unpaid work in Korea is relatively lower is that the unpaid work hours spent by the population other than married women is relatively short. As shown above, in Korea, the population aged between 10~ 18 spend relatively longer hours for learning compared to foreign population. As a result, both Korean men and women aged between 10~18 show short hours spent in paid and unpaid work. Also, owing to the residential structure and lifestyle, Koreans tend to spend less time on house maintenance, cleaning, and clothes maintenance compared to foreigners. The fact that Koreans spend relatively less time on volunteer activities compared to advanced countries can also be an explanation for the economic value of unpaid work being relatively low.

### **III. Conclusion**

#### **A. The Results of Analysis on Productive Activity and Implications**

The productive work hours of Koreans amounted to 6 hrs. 27 min.. By gender, women contributed more to productive activity than did men. Also, women spent more time on productive work than men throughout their lives. Women spent long hours on

productive work even beyond the age of 60. However, as unpaid work is not economically evaluated, the contribution of women to productive activity is not socially acknowledged

When Korea's productive work hours are compared with those of other countries, the time spent by Korean men and women are relatively shorter. Such a phenomenon seems to be closely related to the short hours spent by the population aged less than 20 on productive work, although a more detailed study is warranted. The daily average learning hours spent by unmarried Korean students is 7 hrs. 16 min., which is much longer than the learning hours of foreign population of similar age. Moreover, the productive work hours spent by this age group is extremely short, while the productive work hours spent by Korean men and women aged 30 and above reach, on average, 8~9 hrs. per day. In particular, women maintained an average of 8 hrs. of productive work per day until their 60s. Thus, compared with the similar age groups of other countries, Koreans aged less than 30 spend less time on productive activity than do foreigners, but Koreans aged 30 and above are estimated to spend more time on productive work than foreigners of similar age.

When productive work is categorized into paid work and unpaid work, men spend on average 5 hrs. 10 min. daily on paid work and 49 min. per day on unpaid work. Meanwhile, women spend 3 hrs. 6 min. daily on paid work and 3 hrs. 48 min. per day on unpaid work. In sum, while 55.2% of productive work performed by women is unpaid work, 86.4% of productive work performed by men is paid. Also, 53.6% of the nations' total productive work is accounted for by women and 46.4% by men.

Compared with other countries, Korean men show extremely short hours spent on unpaid work than foreign men. Korean women's time spent on unpaid work was shorter than the time spent by foreign women, but Korean women spent more time on paid work than did foreign women. The fact the Korean women spent longer hours on paid work than foreign women despite showing a lower participation rate in economic activity implies that Korean women's employed hours are very long.

The paid work hours curve by gender, and age shows that both men and women draw a plateau shaped curve and M shaped curve, respectively, as in the economic activity participation rate. In contrast, the unpaid work hours curve by age show that men maintain less than 1 hour, while women in their 20s show a sharp increase in the

time in unpaid work, which peaks at their 30s and gradually decreases. That is, men, throughout their lives, spend extremely short hours on unpaid work, while women perform 4~6 hours of unpaid work during the ages between 30 and 60.

A detailed look into how women's unpaid work is composed reveals that the longest time was spent on household maintenance and meal preparation. Most women aged 30 and above, which means most women after getting married, spend 2 hrs per day on meal preparation and continue to spend, on average, 2~3 hrs per day preparing meal until they reach their 50s. Meanwhile, the time spent on family care peaks for women in their 30s; an average of 1~ 2 hrs per day is spent on pre-school child care and women in their 30s spend, on average, 1 hrs per day on school-child care

Full time housewives in Korea spend, on average, 2 hrs. 26 min. per day on meal preparation and 2 hrs. per day on family care. By gender, the pattern is similar for the age groups of 20s and 30s. However, the hours decrease sharply for the age group of 40s. The age group of 50s show similar patterns to the age group of 40s but then, the hours drop sharply again for the age group after 50s. Compared to other age groups, housewives in their 20s and 30s spend more time on housework because they spend more time on child care.

## **B. Result of Economic Evaluation of Unpaid Work and Implications**

Although the results of economic evaluation of unpaid work differ slightly according to the methods used, in general, the value for unpaid work in Korea resulted in a value between 140 trillion ~ 180 trillion won. The OCA derived the highest value and the generalist method derived the lowest value. The value of unpaid work took up 30~ 40% of GDP and 70~90% of total annual wage. The percentage of unpaid work to GDP in Korea is higher than the percentage in Japan, which is 15~23%, but lower than the percentage in other advanced countries.

By gender, the economic value of unpaid work performed by women amounted to 120 ~ 150 trillion won, and the value of men's work amounted to 24 ~ 38 trillion won. By type of activity, the economic value of child care, which currently performed by women, amounted to an annual 18 trillion won, and the value of taking care of elders and disabled family members amounted to 12 trillion 400 billion won. The economic value of women's time in meal preparation amounted to 42 trillion won, and 15 trillion

won for cleaning.

Of unpaid work performed by men, child care was valued the largest, with 4 trillion 900 billion won, followed by 4 trillion 200 billion won for family care and 3 trillion 700 billion won for cleaning. In sum, while the general level of participation of men in unpaid work is low, men tended to participate in child care, family care, and cleaning.

The economic value of unpaid work in Korea is considerably high. Thus, the goods and services produced from unpaid work need to be evaluated economically and the results need to be reflected in GDP. This can then be used as base material to improve policy efficiency. Moreover, by evaluating the economic value of unpaid work by gender and incorporating the results in SNA, a gender-specific view must be incorporated in the national policies. To this end, gender-specific economic values of unpaid work can be calculated and announced periodically. This will contribute to increasing awareness on women's contribution to national development. Along with such measures, in order to reflect the economic value of unpaid work systematically and consistently in the SNA, satellite accounts for unpaid work must be developed and used..

### **C. Measures to improve Statistics for Economic Evaluation of Unpaid Work**

Time use survey, the Basic survey on wage structure, and the Population census is used for economic evaluation of unpaid work. In order for evaluation of unpaid work to be conducted periodically and more accurately, these surveys need to be revised as follows.

Revisions to time use survey:

The classification of activities used in the time use survey need to be revised. As there is a similar classification corresponding to household maintenance, the existing classification may be used. However, as for family care and volunteer activities, some revisions are needed.

First, for family care, physical care for children, playing with children and helping children with their school work, and caring for disabled children need to be distinguished. Caring for sick children or disabled children should be dealt in the same category as caring for spouse. Also, as family care, including spouse care fall under 'care' related items, it would be desirable to indicate examples of caring for sick spouse

rather than helping spouse get ready for work or massaging spouse.

The activity used in time use survey needs to be distinguished clearly between SNA activity and non-SNA activity. For example, activity related to helping neighbors or acquaintances is productive activity, but it further needs to be distinguished as whether it is SNA-included paid activity or unpaid activity. First, goods or services produced from helping out, without exchange for consideration, in a neighbor's store or farm is included in SNA. However, helping neighbors with housework needed to prepare for extraordinary events is not included as SNA activity. Thus, the activity of helping neighbors need to be distinguished.

Volunteer activities are generally categorized based on volunteer activities. However, rather than using the classification of 'volunteer activity for volunteer groups' or 'volunteer activity for individuals through community service' as is used by UNSD, it would be more accurate to make economic evaluations of the actual activity concerned.<sup>1)</sup> However, the classification of volunteer activities need to be made more systematically. That is, activities related to national or community events include support activities, but also environmental activities, crime prevention, traffic related services, etc. Meanwhile, child-education related services need to be defined as volunteer activity within the boundaries of school. Also, volunteer activity related travel need to be distinguished between travel related to productive volunteer activity and travel related to non-productive volunteer activity, Furthermore, while civil defense training and reserve forces training fall under participation in social activity, unlike other gatherings, they are categorized as productive activity, pursuant to the third-person principle. Thus, these two must be distinguished from other social gatherings.

#### Revisions needed for wage surveys

Wage surveys need to be conducted more specifically according to the different types of jobs. Currently, wage survey in Korea is conducted on 3,400 samples selected via a stratified selection method from business entities having 10 or more employees. Thus, due to the small number of sample, wage statistics are announced only on the three-digit classification jobs. However, jobs highly related to unpaid work are mostly businesses in the service industry, which are generally small in size. As a result, wages for a considerable number of jobs related to unpaid work are announced using the wage for two-digit classifications. This causes problems in evaluating unpaid work using a specialist method.

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<sup>10</sup>)UNSD, *Trail Classification of Time Use Activities*, [http://www.un.org/Depts/unsd/timeuse/icatus/expnote\\_1.pdf](http://www.un.org/Depts/unsd/timeuse/icatus/expnote_1.pdf).

In order to resolve such problems, the sample used for wage survey needs to be enlarged, or a special wage survey on jobs related to unpaid work need to be conducted. Realistically, the more feasible measure would be to conduct a special survey on a 3~5 year interval, along with time use surveys.

## ANNEX

### <Annex 1> Wage Level per Hour by Gender, Education Level and Age-group

(Unit: won, person)

education level	Age	Males		Females	
		wage per hour	number of workers	wage per hour	number of workers
Highschool graduates and below	20 and	3,133	24,479	3,399	59,374
	20-24	4,104	134,991	4,640	315,764
	25-29	5,661	362,115	5,359	212,500
	30-34	6,848	392,808	5,758	97,473
	35-39	7,684	384,584	4,694	108,398
	40-49	8,009	585,305	4,148	234,941
	50-59	6,691	296,070	3,877	118,108
	60 and Total	4,686	99,342	3,793	25,587
		6,781	2,279,694	4,612	1,172,145
College graduates and above	20 and	2,772	113	3,248	885
	20-24	4,374	27,736	4,464	132,302
	25-29	6,698	329,711	6,215	183,583
	30-34	8,971	433,256	8,412	72,838
	35-39	11,356	333,231	10,017	38,551
	40-49	13,858	307,549	12,487	30,468
	50-59	16,127	87,656	13,794	7,859
	60 and Total	13,922	30,014	16,914	2,005
		10,389	1,549,266	6,950	468,491
Total education level	20 and	3,132	24,592	3,397	60,259
	20-24	4,150	162,727	4,588	448,066
	25-29	6,155	691,826	5,756	396,083
	30-34	7,962	826,064	6,893	170,311
	35-39	9,389	717,815	6,090	146,949
	40-49	10,024	892,854	5,106	265,409
	50-59	8,846	383,726	4,496	125,967
	60 and	6,829	129,356	4,747	27,592
	Total	8,241	3,828,960	5,279	1,640,636

Source: Labor Ministry(2000), 1999 Basic Survey of Wage Structure, raw data.

## &lt;Annex 2&gt; Unpaid Work Hours &amp; Population by Gender, Education Level and Age-group

(Unit: minutes, person)

education level	Age	Males		Females	
		unpaid work hour	population	unpaid work hour	population
Highschool graduates and below	20 and below	67.73	3,622,163	89.75	3,402,274
	20-24	53.90	1,050,974	135.73	1,266,538
	25-29	44.62	1,287,081	310.74	1,275,503
	30-34	45.92	1,176,675	358.33	1,409,075
	35-39	38.96	1,417,871	308.92	1,688,175
	40-49	37.14	2,624,596	266.85	3,033,653
	50-59	44.73	1,883,217	268.92	2,164,172
	60 and above	60.04	1,971,294	216.88	3,093,382
Total		51.31	13,375,871	229.20	15,820,772
College graduates and above	20 and below	20.00	1,039	20.00	2,511
	20-24	26.82	113,813	63.17	493,910
	25-29	40.97	747,754	208.70	727,082
	30-34	46.80	802,440	344.25	506,638
	35-39	45.93	807,526	328.86	423,890
	40-49	41.17	824,443	299.09	323,645
	50-59	37.58	378,684	280.89	99,148
	60 and above	81.95	279,017	259.47	36,903
Total		45.59	3,954,716	242.64	2,613,727
Total education level	20 and below	67.73	1,965,202	89.75	1,892,785
	20-24	51.14	1,164,787	114.96	1,760,448
	25-29	43.27	2,034,835	274.61	2,002,585
	30-34	46.27	1,979,115	354.59	1,915,713
	35-39	41.43	2,225,397	312.83	2,112,065
	40-49	38.08	3,449,039	269.73	3,357,298
	50-59	43.72	2,261,901	269.36	2,263,320
	60 and above	62.74	2,250,311	217.33	3,130,285
Total		50.16	17,330,587	230.91	18,434,499

Source: NSO(2000), Report on the Time Use Survey 1999, raw data.

NSO(2000), Economically Active Population Survey: 1999, raw data.

NSO(1997), Future Population Estimate, Population Census