Values of Household Production in Korea Compared to U.S., Australia, Finland, and Canada: An Analysis from a Cross-National Comparative Perspective

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Abstract : This paper utilized a Korean time-use survey and household expenditure survey in designing an input-output table to develop satellite accounts of household production in Korea in 1999. Additionally, the household production in Korea was compared with that in the United States, Australia, Finland, and Canada. Results of this study may be summarized as follows. First, household production in Korea represented 43% of Gross Domestic Product (GDP,) compared to 63% of GDP in the United States, 68% in Australia, 58% in Finland, and 54% in Canada. Second, labor emerged as the largest input for household production in Korea, while materials and services - both intermediate goods - emerged as the second input. On the other hand, the proportion of housing among the four inputs of household production in Korea was greater than for either the United States or the other countries studied. This implies that the cost of intermediate goods and housing in Korea is more expensive than in other countries.

Key Words : household production, input-output table, satellite accounts of household production

I. Introduction

In this study, unpaid household work is considered a production activity, and as such is compared to labor paid for in the marketplace. The significance of household production through labor was first illuminated by 'New Home/Family Economics' in the late 1960s. Household labor generated goods and services that are eventually consumed in households; as such this labor aimed to meet the needs of household members and in so doing maintained the function of the household. As their interpretation gained credit in the field, several studies subsequently evaluated the economic value of household labor, compared the value of household production with that of market production, and measured the overall value of household products within the national economy. In particular, research on the development of satellite accounts for household production formally proposed the inclusion of labor statistics compiled by the Satellite Household Production Account in comparing overall Gross Domestic Product (GDP) and the United Nation's System of

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National Accounts (SNA).

SNA's exclusion of household production figures caused a skewed and problematic picture of overall GDP. The accounts reflecting only market production and excluding household production were criticized for under-evaluating contributions by housewives and overlooking their significant contribution to total human production. The inclusion of the economic value of household production in the form of satellite accounts is vital to any study comparing market and non-market production; as such, household production is considered a real macroeconomic indicator for economic growth and production. Consequently, the SNA was revised in 1993 to include household production.

Given this revision, the task of developing input-output tables to establish satellite accounts of household production was actively performed in many nations, initially developed in Australia by Ironmonger (1989), who designed input-output tables for measuring household production. Henceforth, this input-output approach has been accepted as a reliable basic model for developing satellite accounts of household production in many nations. Indeed, in the 1990s several European nations, Canada, and New Zealand calculated and published reports using satellite accounts in household production that relied on input-output figures. Meanwhile, the OECD also encouraged its member countries to use input-output figures for developing satellite accounts of household production. Nevertheless, even though numerous member-nations attempted to develop satellite accounts of household production, at the same time other member-nations showed little interest in doing so. Consequently, little progress was made for some time in establishing satellite accounts of household production.

Similarly, in the United States, national data on time use was not being collected either. Little progress was made in developing satellite accounts from 1989 until 1994, when Douthitt (1994) calculated total household production in the United States on the basis of Ironmonger's input-output model and compared it with the Australian counterpart. Also that year, Huang (1994) calculated household production of female-headed households and developed their corresponding satellite accounts.

This significant progress in the development of satellite accounts of household production contrasts with the lack thereof in Korea, where there is a lack of nationwide data regarding time use. To be exact, a few studies in Korea did attempt to evaluate the economic value of household labor but were hindered by the small size of their samples. Meanwhile, a few previous studies examined the economic values of household labor in the composition of Korea's GDP but failed to include intermediate and capital goods (in addition to labor) as inputs in household production. Fortunately, the subsequent collection of national data on time use by the Korea National Statistical Office (1999) made it possible to conduct more extensive and thorough studies.

This paper aims to analyze and compare household production in Korea with that in the United States and relies on the input-output model used by Ironmonger (1989), a standardized method utilized in many advanced nations. Household production in both nations and corresponding

relevant studies of the process of household production are compared with studies conducted in Australia, Finland, and Canada.

Certainly the valuation of household production on its own has merit, but extending that approach to comparing national and satellite accounts across nations is additionally useful. Meanwhile, our lack of knowledge regarding satellite accounts of household production in Korea places great emphasis on all existing relevant research and makes it even more important to compare household production across nations. As such, this research offers a significant starting point for further studies in this field by providing basic data regarding satellite accounts in Korea and further comparing it to that in other advanced nations.

II. Literature Review

1. Unpaid Housework and National Income Accounts

Unpaid housework or non-market work implies unpaid activities by men and women conducted for themselves, for other household members, or for the community; these activities may be replaced for a fee by market goods or services. The stipulation of only including activities that could be accomplished by a person hired from the labor market (and outside the household) fulfills what has come to be known as the "third person" criterion of unpaid work (Hawrylyshyn, 1976). Absolutely no non-paid housework activity was recognized by the System of National Accounts until 1993, when the SNA began including the value of non-market goods produced for family use.

From a theoretical perspective, economists should be concerned about the previous omission of unpaid work from the SNA's measures, which had purported to reflect the sum of all productive activity in a nation. And from an international perspective, when SNA measures exclude the value of unpaid work, those less developed countries with economies that rely heavily on informal markets for trade appear to be much less prosperous than do the more developed countries. SNA's inclusion of non-market production of certain goods (especially subsistence agrarian activities) was intended, in part, to remedy this problem.

SNA's exclusion of unpaid labor undoubtedly biased economic measurements, especially when substitutions from unpaid to paid activities were erroneously measured as growth in the economy. In this vein, consider this potential bias in regards to the increase of women's participation in the U.S. labor force. For example, when a parent remains out of the paid labor force and is the primary unpaid care provider for their children, we attribute no dollar value to this economic contribution. But if said parent enters the labor force and hires childcare, the value of that service (as measured by the price paid) is immediately counted in GDP. Within this scenario - first ignoring unpaid household work and then attributing such production substitution effects to real economic growth - we see that current measures of GDP may be dangerously false indicators of economic growth and well-being. Further, if the quality of market purchased childcare services is equivalent

to the home-produced services, the GDP "growth" that results from our substitution of parental care simply represents a one-to-one trade-off, or no real economic growth. At present, the scientific measurement of these issues is mixed, and social scientists are a long way from reaching consensus about whether market-purchased goods (like meals) and services (like day care) are on a par with the home produced goods and services they replace. If indeed market-purchased goods are inferior to the home-produced ones they replace, then GDP in the United States is not simply at a standstill; instead, we are really experiencing a net decline in GDP.

Robert Eisner is one of several contemporary authors who has written on the subject of including unpaid work in national income accounts. In his book *The Total Income System of Accounts* (Eisner, 1989), he reviewed the Extended Income Accounts literature and various proposals to measure not only unpaid household production, but also unpaid government services. These Extended Income Accounts (EIA), just as their name implies, propose leaving intact the central accounting procedures of income accounts, and simply "extending" the accountancies to include additional measures. In addition to his own work, Eisner reviewed the EIA proposals of Jorgenson and Framaeni (1987), Ruggles and Ruggles (1982), Zolatas (1981), and Nordhaus and Tobin (1972). A major difference among the authors involves just which unpaid activities to include in their model. Some propose including only activities that meet the third-person criterion, while others would also include recipient-only activities.

2. A central framework of a System of National Accounts like the Extended Income

Accounts is advantageous in that it represents an integrated accounting structure that is exhaustive and consistent. However, it is limited by its inflexibility and inability to accommodate alternative measures simultaneously. In contrast to the EIA genre of accountancies are proposals to establish satellite measures of unpaid work. Satellite accounts stress the need to expand the analytical capacity of national accounting for selected areas of social concern in a flexible manner without disrupting the central system of accounting. The United Nations recommended the use of satellite accounts to establish international standards for measuring the boundary of production, standards that would include household work and voluntary work, arguing that these additional dimensions greatly enrich the analytical power of the nation's accounting approach.

Many researchers are interested in ensuring that accounting for household labor, as for national income accounts, capture a measure of value added. Scientists generally prefer measures of household production output, rather than ascribing an arguably arbitrary value to time use to somehow measure the contribution of labor. Chadeau (1992) used the output methodology that requires a market value be assigned to all goods and services produced in the home. In this approach one must have complete data on quantities and quality of goods and services produced. Such data collection is complex, expensive and fraught with limitations,

thus few others have adopted this valuation technique. However, when thorough output measures are available, the value of time is calculated as the difference between that value and direct related intermediate expenditures.

The model as a satellite measure of household production using input valuation as an input-output model was first proposed by Ironmonger (1989), mentioned earlier. This approach is unique because it incorporates not only measures of time value but also consumer expenditures as inputs to household "industries" that when taken together comprise the complete household production process. Ironmonger's model is intriguing not only because of its conceptual consistency with paid industry's measurement of labor and capital's value added, but also because of its consistency with Gary Becker's (1981) conceptual model of household production and the way households combine time and purchased market goods to generate home produced goods and services.

There are several steps involved in building such a model: (1) identification of household activities, (2) measurement of household time use in each household activity, (3) valuation of unpaid work, and (4) measurement of household expenditures for goods and services used in each household production process.

Ironmonger's classifications of household work - widely accepted now - included the unpaid activities of home meal preparation, laundry and cleaning, repairs and maintenance, other household work, education and community work, child care, shopping, and gardening.

As mentioned earlier, step three in this model's development involves establishing a means to value unpaid household work. Early attempts to estimate household production's value, like those developed by Gager and Walker (1980), involved assigning a monetary value to time spent in different unpaid productive activities, like meal preparation, dish washing, laundry, etc. Generally, three different methodologies have been used to do this: (1) the service replacement cost method; a calculation of the cost to replace each separate service, (2) the household technician replacement cost method; a valuation of total household work hours at the going wage rate paid to a housekeeper, or (3) the market wage rate (opportunity cost) method; a valuation of each hour of house work a family member does at that person's actual or potential wage rate.

There have been numerous attempts to derive population estimates of unpaid work's monetary value and subsequently compare that value to paid production activity measures like GDP. For example, Murphy (1982) used various methodologies to value household production time and compared both his and previous authors' findings with GDP. His estimates of the value of unpaid household work to GDP range from 26-47%. In this study, as in Ironmonger's (1989), the average market wage for men and women was utilized.

The final component of this model involves measuring household expenditures for goods and services used in each household work activity. Each detailed expenditure category was considered for allocation to one of the household industries, using standards first applied by Ironmonger.

III. Research Methods

1. Data

This paper utilizes the Korean Time-use Survey and Korean Household Expenditure Survey published by the Korea National Statistical Office (KNSO) in 1999. Using that data, this study built an input-output table in order to understand and compare the process and size of household production.

The time-use survey employed a time-diary method in which respondents recorded all activities during 48 hours over two consecutive days. Activities were recorded by 10-minute intervals as either primary or secondary activities. A total of 17,000 households were selected for the sample, with 46,000 household members being over age 10 and living in Korea. The sample was selected by stratified random sampling to be a good representation of the Korean household. The days for recording the time-diary were assigned to one of five groupings: (1) Friday and Saturday, (2) Sunday and Monday, (3) Tuesday and Wednesday, and so on. The final response rate was 93.2%.

Besides the actual survey instrument (time-diary), this study utilized Korean Household Expenditure data as mentioned above. This data is collected on a quarterly basis and provides consumption expenditure information for Korean households. The 1999 data is the most current available, and includes information for income and expenditures by quarter in 5,141 Korean households, from 16 regional strata, utilizing a sampling poll of 697. Respondents used a household expenditure diary to report all their expenditures on a given day. According to the KNSO, the average response rate for this survey was 82% (2002).

2. Methods of Data Analysis

An input-output table of household production in Korea was generated on the basis of Ironmonger's model. All the tables recorded the annual time spent for seven types of household work: preparing meals, cleaning and laundry, shopping, child care, repairs and maintenance, gardening, and other miscellaneous household work. To tabulate a monetary value for time spent in household work, this study utilized the opportunity cost method, in which each hour of housework is tabulated at the worker's actual or potential wage rate. Total time spent for household work was multiplied by the average wage in 1999, to establish the opportunity cost for household work.

Next the annual and national monetary value was estimated by multiplying the opportunity cost by the number of men and women. The total number of surveyed Koreans age 19 or over was 36,490 in 1999, 18,423 men and 18,067 women.

In <Table 3>, consumption expenditures were recorded in order to calculate amounts of intermediate goods and capital goods as inputs of household production. Here, the single household was used as the unit of measure, and per-household non-wage labor's equivalent dollar value was measured as total household production. To obtain estimates of national household production, the number of households was multiplied by the number of inputs of intermediate and capital

goods. The total number of Korean households surveyed numbered 14,312.

After recording all information for household production inputs, the value of annual household production was calculated. In addition, the value of household production was calculated separately by category: materials, services (as intermediate and capital goods), and housing. Finally, after completing the input-output table of household production in Korea, this data was compared to research by Douthitt for the United States and Ironmonger for Australia, Canada, and Finland.

IV. Results

1. The Economic Value of Household Work

Labor for household production was measured as total time spent for housework and time spent in housework by Korean men and women is shown in (Table 1). In comparing housework time in Korea to that in the United States, the results showed that men in the United States spent two hours per day doing housework while Korean men spent an average of 29 minutes per day. On the other hand, Korean men averaged 39 hours a week in the labor market, while American men averaged just 30 hours. In sum, while Korean men spent less time doing housework than their American counterparts, their time in the labor market was greater than that for U.S. men.

When we look at housework done by women, we find Korean women average 4 hours and 13 minutes a day, and American women average 3 hours and 52 minutes a day doing housework. In particular, Korean women spend more time in cooking and child care than their American counterparts, while American women spend more time shopping and gardening. Both Korean women and men spent more time working for wages and less time in leisure activities than their American counterparts.

When comparing time spent by gender doing housework, despite spending great hours in the

<Table 1> Time-use of Korean men and women

(per day, hour: min.)

	Sex	meals	clean laundry	shopping	child care	repairs	garden	Misc.	total house-work	paid work*	human invest*	leisure*
Korea (1999)	Female	1:41	1:05	0:20	0:42	0:06	0:03	0:16	4:13	31:58	1:59	33:22
	Male	0:05	0:07	0:03	0:08	0:03	0:02	0:01	0:29	39:02	3:02	36:31
	% of males' to females'	5%	11%	15%	19%	50%	67%	6%	11%	122%	153%	109%
U.S. (1985)	female	1:15	1:01	0:40	0:29	0:03	0:11	0:13	3:52	18:05	1:31	46:33
	Male	0:20	0:14	0:25	0:08	0:15	0:21	0:17	2:00	30:06	1:59	49:49
	% of males' to females'	27%	23%	63%	28%	500%	191%	131%	52%	166%	131%	107%

note: % of males' to females' = (male's time / female's)*100

note: * are time per week

labor market, Korean women also spent more time doing housework than Korean men. When time spent by men in housework is measured in relation to that of women, the ratio for American men is 52%; the ratio for Korean men is only 11%. As most housework in Korea is performed by Korean women, total housework done by Korean men is much less than that by American men. In other words, despite the burden of long hours spent earning a wage, Korean women are also primarily responsible for household work.

Time spent in housework can be compared by country, and numerous studies have reported information about time-use. According to Ironmonger (1996), Australian men spent 2 hours and 46 minutes per day on housework, while Australian women spent 4 hours and 50 minutes per day on housework, more than their counterparts in either the United States or Korea. The difference was especially noticeable with men. Hamdad (2003) reported that women and men in Canada spent 28 and 17 hours per week on housework, respectively, while the ratio of men's contributions to total household labor was 37%. In sum, Australian men spent more time doing housework than their counterparts in Korea, the United States, and Canada.

2. Consumption Expenditures by Households

In order to examine the size of household production, this study employed data on consumption expenditures so as to investigate input such as intermediate and capital goods, including housing. <Table 2> provides an analysis of inputs in household production in Korea and the United States. In this table, consumption expenditures in households average 25,023 thousand Won: ($20,852) in Korea, and $30,339 in the United States. In Korean households, in particular, housing accounted for 27% of total expenditures; in the United States this figure was 16%. In sum, household consumption costs were 9% higher in Korea than in the United States. In contrast, expenditures for capital goods were 15% and 4% of total expenditures in the United States and in Korea, respectively. This implies that

<Table 2> Expenditures in household production of Korea and U.S.

(per household, year)

input categories		Korea (1999)		U.S. (1999)	
		Won ($)	(%)	($)	(%)
intermediate	material	6,888,000 ($5,740)	(27.5%)	8,129	(26.8%)
	service	8,602,000 ($7,168)	(34.4%)	10,539	(34.7%)
	energy	1,670,000 ($1,391)	(6.7%)	2,227	(7.3%)
	total	17,160,000 ($14,300)	(68.6%)	20,895	(68.9%)
Capital		1,029,000 ($ 8,575)	(4.1%)	4,687	(15.4%)
Housing		6,834,000 ($ 5,695)	(27.3%)	4,757	(15.7%)
Total		25,023,000 ($ 20,852)	(100 %)	30,339	(100 %)

note: For U.S., it was adjusted to 1999 Dollar value, using Consumer Price Index.

housing costs are higher in Korea than in the United States, while expenditures for capital goods except housing are higher in the United States than in Korea. In sum, expenditures for intermediate goods among three inputs for household production (intermediate capital goods, capital goods, and housing) were very high in both countries, averaging 69% overall.

3. Evaluation of Household Production

<Table 3> presents an input-output table for household production in Korea, the United States, Australia, Finland, and Canada. To compare household production in Korea to that of other countries, the input-output figures for the United States are derived from Douthitt's work (1994). Meanwhile, figures for Australia, Finland, and Canada are based on Ironmonger's (1996) study.

As shown in <Table 3>, in 1999 total household production was at 20.5 trillion Won, or 43% of Korea's GDP. When studied by category of household work, food and meal preparation emerges as the largest component (7.7 trillion Won), followed by child care (4.8 trillion Won), and household services and others (3.5 trillion Won). Meanwhile, total household production in the United States in 1985 was $26,385 billion, or 63% of GDP. Again, food and meal preparation emerge as the largest component ($1,326 billion), followed by shopping, cleaning and laundry, and child care. In Australia, preparation of food and meals and shopping were $90 billion and $61 billion, respectively, in 1992, followed by cleaning and laundry ($58 billion) and child care ($44 billion). In Finland, total household production in 1990 was 270 billion Fim (Finland currency), or 58% of GDP. In Canada, total household production was $254 billion (Canadian Dollars) in 1986, or 54% of GDP.

In comparing household production as portion of GDP, this figure is highest in Australia (69% of GDP), followed by the United States (63%), Finland (58%), and Canada (54%). This input-output model further shows that under 37% of those goods and services in the United States (58%, 13%, 42%, 46%, for Korea, Australia, Finland, and Canada) were considered final consumption in National Income Accounts; indeed these goods and services undergo another value-added production process before their consumption by households. In addition, household production's high contribution to GDP in Australia may reflect the fact that Australian men spend more time doing housework than their counterparts in the other countries studied (Ironmonger, 1996). Meanwhile, women in Australia also spend a greater amount of time doing household work, which in turn helps to increase the total time spent in household production there. Conversely, even though household production activity is much greater for Korean women than for women in the United States, the resulting measurement of household production as a portion of GDP remains lower in Korea than in the United States because Korean men contribute so little to household production there, in part because of their high involvement in paid labor.

In Korea, household production's low contribution to overall GDP may be explained in part by the lower opportunity cost for women's

<Table 3> Household Input-Output Table of Korea and other countries

		Meals	Cleaning Laundry	Repairs	Other Domestic	Child Care	Shopping	Garden	TOTAL (% GDP)
Korea (1999)	Labor	27,638	9,277	1,962	32,844	23,365	13,741	2,914	111,743 (23.2%)
	Intermediate	45,348	7,861	37	1,267	22,346	164	1,536	78,562 (16.3%)
	Capital	1,529	1,545	442	1,431	5	1,044	387	6,384 (1.3%)
	Housing	3,245	1,093	1,515	10	2,589	16	287	8,758 (1.8%)
	Total	77,762	19,777	3,957	35,553	48,306	14,966	5,125	205,448
	% of GDP	16.1%	4.1%	0.8%	7.3%	10.0%	3.1%	1.0%	42.6%
U.S. (1985)	Labor	488,938	385,311	93,405	140,977	239,129	511,066	159,991	2,018,817 (47.9%)
	Intermediate	233,884	41,648	1,805	43,293	97,324	48,010	18,482	484,448 (11.5%)
	Capital	14,659	12,426	4,464	2,779	9,524	41,472	3,981	89,305 (2.1%)
	Housing	15,347	12,094	2,932	4,425	6,196	0	5,022	46,016 (1.1%)
	Total	752,828	451,479	102,605	191,474	352,174	600,549	187,476	2,638,586
	% GDP	17.87%	10.72%	2.44%	4.54%	8.36%	14.25%	4.45%	62.63%
Australia (1992)	Labor	53,511	50,238	51,124	34,386	13,362	21,809	22,431	246,861 (52.6%)
	Intermediate	32,907	4,212	1,629	2,579	8,061	8,276	1,977	59,641 (12.7%)
	Capital	2,197	2,154	1,083	468	716	2,046	3,517	12,181 (2.6%)
	Housing	1,098	1,029	274	457	617	0	480	3,955 (0.8%)
	Total	89,713	57,633	16,348	25,935	43,780	61,446	27,783	322,638
	% of GDP	19.1%	12.2%	3.4%	5.5%	9.3%	13.0%	5.9%	68.7%
Finland (1990)	Labor	63,836	43,323	22,676	14,053	20,513	30,160	15,277	209,838 (44.7%)
	Intermediate	38,905	2,621	1,603	695	5,189	1,900	864	51,777 (11.0%)
	Capital	1,097	882	218	53	58	25	726	3,059 (0.6%)
	Housing	2,234	1,516	793	492	718	0	535	6,288 (1.3%)
	Total	106,072	48,342	25,290	15,293	26,478	32,085	17,402	270,962
	% of GDP	22.6%	10.3%	5.3%	3.2%	5.6%	6.8%	3.7%	57.7%
Canada (1986)	Labor	45,337	39,861	11,406	7,392	27,684	65,351	2,351	199,382 (42.2%)
	Intermediate	25,502	3,943	1,972	1,278	4,674	5,704	1,736	44,809 (9.4%)
	Capital/Housing	2,928	1,137	670	434	909	3,462	67	9,607 (2.0%)
	Total	73,767	44,941	14,048	9,104	33,267	74,517	4,154	253,798
	% of GDP	15.6%	9.5%	2.9%	1.9%	7.0%	15.7%	0.8%	53.7%

note: Input-output tables of Australia, Finland, Canada were adjusted using Ironmonger(1996).

note: Million Won for Korea, million $, million Australian $, million Canadian $ for U.S., Australia, and Canada, and million Fim for Finland.

housework there. The labor force participation rate by Korean women (47% for all women; 38% for married women; KNSO, 1999) was lower than for women in the United States or the other countries in our study. In addition, wages differ more for men and women in Korea than they do in the

United States, and Korean women place a lower value on their housework labor than women elsewhere. In sum, these differences all likely contribute to shaping the seemingly low contribution of household production to GDP in Korea as compared to that in the United States or the other countries in our comparison.

On the other hand, the results of this study do not support the general consensus that household production in more developed nations - with their corresponding high portion of women participating in paid labor - is smaller than in undeveloped nations, with their corresponding lower portion of women participating in paid labor. Even though Korea's market economy is smaller than that of more advanced nations, this study notes that the country's proportion of household production that contributes directly to market production is not higher than that in said nations. This finding is consistent with those of Goldschmidt-Clermont and Pagnossin-Aligisakis (1999), which found that countries with relatively low market production levels may not always have a higher proportion of household production than countries with higher levels of market production.

The gaps between household production and GDP are highly correlated. Landefeld and McCulla (2000) argued that the shift from market production to non-market production has been overstated in developing countries like Russia and much of Eastern Europe, with the decline in GDP for these countries. In addition, they argued that the actual measurement of GDP in developed countries has been overstated, given the high rate of women there participating in paid labor. In sum, the exclusion of non-market household production values clearly distorts comparisons of output, while simple comparisons of non-market and market production must be considered less than accurate because of the varying correlation between the two production sectors.

As mentioned above, some degree of caution is required when comparing measurements of household production across nations. The major factors that shape measurements of household production in a nation include the measurement of opportunity costs for women's time spend doing housework, hours of time in and wages for paid labor, and men's relative participation in housework. Murphy (1982) points out that study results are unavoidably sensitive to the researcher's valuation techniques. Because our analysis uses wage rates for men and women, lower estimates result for time values for housework. Further studies should compare household production with the shift of market production across nations.

V. Conclusions

This research developed an input-output table for Korea, and compared household production there with that in the United States, Australia, Finland, and Canada. Results of this research are summarized below.

First, time spent in housework emerged as the most significant input for household production; this figure is 29 minutes per day for Korean men, compared to 2 hours for American men. Conversely, Korean women spent more time working in the labor market and in the household than their American counterparts. It is no stretch to

suggest that women in Korea are very challenged by their dual responsibilities.

Second, total household production in Korea was 20.5 trillion Won, or 43% of GDP in 1999. Food and meal preparation was the largest segment in Korea, followed by cleaning and laundry, and child care. In the United States, household production accounted for 63% of GDP, while in Australia it accounted for 68% of GDP. In Finland and Canada, household production accounted for 58 and 54% of GDP, respectively. Compared to other countries, the relatively high participation of Australian men in household production likely explains why household production is such a large portion of GDP there.

This study found that several research agenda must be considered in order to both understand the complex process of household production and to design national satellite accounts for household production. First, a nation's market economy must include wage rates and hours of housework as very significant factors in overall production. In order to measure household production at the macro level, opportunity costs were accepted as a standardized method in many nations. In this approach, wage rates are an opportunity cost for household work and as such are major determinants in national household production and critically related to the nation's market economy. Wage differentials between men and women also differed across nations, contributing greatly to variances in household production across nations. As hours of work in paid labor critically influence the hours spent doing housework, wage rates that influence these hours are very critical when assigning a value to household labor.

Second, this study made an interesting finding regarding household production as a portion of total GDP. Overall market production in Korea is less than that in the United States, while women's participation in the Korean labor force is lower than that in the United States. Meanwhile, longer hours of market work among Korean women and the low participation of men in household labor there both combine to make household production in Korea lower than that in the United States.

In advanced nations, market substitute goods for household production are easily available, thanks to the rapid progress of the commercialization of household labor. For this reason, households in undeveloped countries appear to produce fewer items than households in more developed countries. It is possible, for example, that if households in developing nations are too poor to buy paint to repair their homes, then the lack of affordability makes it impossible to increase the use of such types of household products. This study shows that this logic explains why a smaller portion of household labor exists in Korea than in other advanced nations.

In sum, a nation's household production is influenced by national economy, population structure, time spent in housework, labor force participation rates, and wages for men and women. In addition, it is important to note that production levels also differ depending on a survey's time period and method, the composition of the population included in calculations of household production (usually over age 18), wage rates, and measurement thereof.

This study points out gaps in our knowledge, and generates some research agendas apt for

governments, research institutes, and statistical institutions that seek to measure and understand household production and its impact on GDP. First, fundamental changes for measuring the market sector are vital if those concerned hope to understand the process and structure of the economy. In the past, expenditures for intermediate goods were treated like energy, measured as expenditures for final consumption. This approach is problematic and needs to be modified. In other words, both expenditures for intermediate goods like services, materials, and energies, and expenditures for durable goods, which were measured as expenditures for final consumption, should be included in the calculation of household production. In addition, expenditures for house ownership as separate from household production must instead be included in the category of household production. Revisions and corrections must be made in the calculation of GDP so as to implement a broader understanding of household production.

Second, efforts must be made to improve concepts and methods of data collection if those concerned hope to precisely measure the size of household production. In order to facilitate comparisons among countries, methods of data collection must be standardized. Household production measurements must be tabulated and published annually. Household production has various features that are distinctly different from market production. Above all, household production is more elastic than market production; specifically, when household production rises drastically, monetary expenditures decline drastically.

In addition, the quality of labor in household production is critical. Finally, the law of diminishing marginal returns does not apply in household production, as a continually increasing level of household labor could result in the deterioration of both quantity and quality of household products. New approaches for calculating household production are required if those concerned hope to consider these features. Britain's Statistical Office conducted broad scale surveys in order to calculate household consumption levels and to measure household production at the national level.

Finally, government support is essential for those who hope to research household production. For example, government support is required to regularly collect national data regarding time use and consumption of and expenditures for durable and capital goods as a component of household production. Meanwhile, current government policies have narrowly focused on household production and have overlooked the very visible production component of market economies. For example, in order to assist the poor and elderly, production activities must be more broadly defined to include unpaid household labor like child care, caring for patients, and caring for the elderly and physically handicapped, in addition to marketable services with an improved definition of household labor established as a guide. Governments must build policies that provide balanced tax benefits and subsidy programs.

Given the scarcity of research at the macro level, this research aimed to "reactivate" relevant studies of household production by calculating and comparing household production among nations. Notwithstanding, data utilized in this study was

limited because the only available surveys compiled in Korea, the United States, and other nations were published at different times.

In addition, the level of studies addressing household production differed across nations, with significant progress made in some nations but not in others. Regular reports of household production will require more attention and research in most nations. In addition, further research should attempt to somehow standardize the diverse research methods at hand today. Substantive study is vital if we hope to expand our limited understanding of the size and process of household production to include different family structures. Finally, sufficient future research is needed to understand the differences in quantities and qualities in household labor from nation to nation, addressing different populations, different cultures, and different family compositions.

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