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# TIME VS. GOODS: THE VALUE OF MEASURING HOUSEHOLD PRODUCTION TECHNOLOGIES

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## ABSTRACT

We take U.S. and Israeli household data on expenditures of time and goods, generate an exhaustive set of commodities that households produce/consume using them, and calculate their relative goods intensities. Leisure activities are uniformly relatively time intensive, health, travel and lodging relatively goods intensive. We demonstrate how education and age alter the goods intensity of household production. The results of this accounting can be used as guides to: Understanding how goods and income taxation interact to affect welfare; expanding notions of the determinants of international flows of goods; generating models of business cycles and endogenous growth to include interactions of goods and time consumption; and obtaining better measures of the distribution of well being.



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## I. Introduction and Motivation

Becker's (1965) introduction of the idea of the household as a factory combining market goods and time to produce a utility-maximizing set of commodities has generated applications and insights in a wide variety of areas of economic analysis. The bulk of the research (surveyed in Gronau, 1986, 1997) has focused on issues in labor economics—how education generates efficiencies outside the market context (Michael, 1973); how purchased goods and the supply of labor interact (Abbott and Ashenfelter, 1976), and how different dimensions of time use are affected by incomes and the price of time (Biddle and Hamermesh, 1990). It has been instrumental in the analysis of a variety of areas closely related to labor economics, particularly economic demography, health economics and transportation economics.

The construct has also had some impact in other sub-disciplines. Some macroeconomists have argued that accounting for the existence of household production allows better tracking of the path of market output (Benhabib *et al*, 1991, Greenwood *et al*, 1995). Others (e.g., Ortiguera and Santos, 1997) have incorporated the demand for leisure into explanations of the non-convergence of per-capita incomes in the context of the new growth theory. Public finance economists have long understood the impact of taxes on time use and goods consumption (e.g., Boskin, 1975). Household production does not appear to have been noticed in the literature on the determinants of international trade flows, although one can view complex assumptions about preferences for goods (e.g., Markusen, 1986) as being generated by a need to account for household production.

This welter of research has proceeded absent any direct information on the nature of the set of commodities that households produce or on household production functions. It examines time allocation and goods expenditures separately.[1] In spite of the major role that the time

[1]A few partial exceptions exist. Ironmonger (1989) began some efforts, followed by Landefeld and McCulla (2000) and a few others to add the value of some of the time spent in household production into a set of "satellite" national

intensity of different activities plays in the analysis, none of the studies has considered how different uses of time and flows of purchased goods are combined, and none has examined which activities are relatively goods intensive. The richness that might be implied in these areas by knowledge of the relative importance of goods and time in different activities has not been explored, perhaps because nobody has studied how people actually combine time and goods.

Knowing facts about household production is crucial in a variety of areas. Labor economists cannot measure changes in relative well being by looking at the distribution of goods alone, as the utility from their consumption depends on the time allocated to them. Public economists assume that income taxes affect the supply of labor, creating a labor-leisure dichotomy. Yet within the category "leisure" different activities are affected differently by income taxes, because the time that is taxed is combined with different amounts of purchased goods; and these effects in turn feed into the demand for market goods. Similarly, the welfare effects of taxes on different goods cannot be measured just by looking at their impacts by income class. We need to know how they affect household time use, and for that we must know which goods are combined with large amounts of time, which with little, and how these combinations differ by income level.

Macro models using the notions of household production have not considered how interactions between time allocation and goods production might change as economies develop and the changing price of time alters the mix of goods. For example, as the shadow price of time rises relative to the shadow value of income, cycles in spending on consumer durable goods will be altered to the extent that these are used to produce relatively more or less time-intensive commodities. International flows of goods will differ depending on how countries combine those goods with their residents' time. As international differences in full incomes vary, the

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accounts. Another literature focuses on inferring household production of childcare, including Aslaksen *et al* (1996) and Apps and Rees (2001). Lecocq (2001) takes a French household data set with information on expenditures and a few time inputs to examine separability in the household production of meals.

types of goods that consumers in different countries wish to buy will vary, altering relative demands for traded goods.

In this note we provide the first complete accounting for how households combine goods and time to generate commodities. We create a consistent set of broadly defined commodities and assign time and goods inputs to each in order to measure their relative goods intensities. This is purely an accounting exercise—we neither generate nor test hypotheses about how these combinations proceed. Rather, we construct a set of commodities, adduce facts about their relative goods intensities and examine how these vary with a correlates of household income. We create almost identical accounting procedures for two different economies and argue that common results justify drawing conclusions about the nature of household production generally.

**II. Constructing Commodities**

As in any accounting exercise, classifying activities is fundamentally arbitrary. Even if we had data on expenditures on goods and time in the same households, we would still need to create arbitrary classifications. Whether one purchases groceries to combine with time spent shopping, cooking, eating and cleaning up, or buys an air conditioner for one's house, the analyst must still decide into what consistent set of commodities to classify these goods and time uses, and how to combine them. The exercise achieves value by its consistency and by whether the classifications make sense.

Regrettably, no single data set anywhere in the world meets the ideal: Information from time budgets on how household members spend their all their time (not recall data on a few major activities) and records of the same households' purchases of goods and services. Many countries have produced surveys, recently annually, of consumer expenditures. Time budgets, showing the time allocations on a detailed set of activities by respondent households on one or two days, are scarcer. The combination of separate time-budget and expenditure surveys in the

same year is relatively rare, but it does exist in the United States for 1985 and in Israel for 1992.

The 1985 U.S. Consumer Expenditure Survey contained quarterly observations on a rotating panel of about 5000 households, so that we have approximately 20,000 quarterly observations. The usable sample is 12,289 observations, due to requirements that the observation is for a married-couple household and that some demographic data are available.[2] The Americans' Use of Time 1985 survey (Robinson and Godbey, 1999) surveyed roughly 5000 individuals, including both spouses in married households. Each filled out one diary of his/her time, classified into 87 basic activities. The need to use married couples with complete diaries by each spouse left a sample of 697 households.

The Israeli Consumer Expenditure Survey 1992-93 contains information on the consumption patterns of 3,168 married couples. The Israeli Time Use survey 1991-92 (CBS, 1995) covered over 3,000 Jewish Israelis. In the diaries respondents reported the main activity (out of a list of 87 that overlap somewhat with the U.S. categories).[3] Only 619 married couples can be included in the sample.

Any definition of commodities requires choices about categories and the classification of inputs of goods and time. One might, for example, argue that most human activities, including purchasing/renting and maintaining housing, maintaining one's appearance, eating and even sleep, simply provide the "overhead" that enables consumers to produce and enjoy a few narrowly-defined purely leisure activities.[4] This argument may perhaps be correct at some level;

[2]Because of the sparseness of the time budget samples and the need to match households by type, the analysis requires using married couples only.

[3]While each household reported diaries for only one day in the U.S. data, in Israel many households reported two or more days. In both countries the days reported are distributed randomly over the week.

[4]Throughout our calculations we adhere strictly to Becker's definition of production time. It includes work at home and direct consumption time but excludes "indirect consumption time." Thus LODGING includes home maintenance time, but excludes the time a person enjoys being at home (or thinking of it), and EATING includes shopping, cooking and eating time, but excludes the time the person is not hungry (or relishes last week's meal). Any other definition would make the concept of a time constraint meaningless. Similarly, we ignore the even more

but it is quite inconsistent with procedures in national income accounting that examine the value-added of all goods produced. A useful and exhaustive set of commodities is:

SLEEP
LODGING
APPEARANCE
EATING
CHILDCARE
LEISURE
HEALTH
TRAVEL
MISCELLANEOUS

The detailed assignments of time use and expenditure categories for each commodity are presented in Appendix Table 1.[5] We assume that SLEEP is produced only with time. We exclude time devoted to market work and a prorata share of transportation expenditures, both because market work is generally viewed as yielding disutility and because in most cases it is not a direct input into production at home. Transportation expenditures are included in TRAVEL except for the amount that is prorated to market work.

## III. The Relative Goods Intensity of Commodities

Our decisions about how to classify goods and time expenditures differ slightly in the two countries because the classifications in the surveys differ. Average goods intensities also differ with the countries' standard of living. In order to circumvent this problem (including the specific problem of calculating cost-of-living corrected exchange rates for specific expenditure groups), we focus on the relative (to the average commodity) goods intensities of the various commodities.

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inchoate outputs, such as the transactional benefits generated by, e.g., family meals and joint leisure activities (cf. Ben-Porath, 1980; Hamermesh, 2002).

[5]Neither time budget survey reports secondary activities. Evidence (Gronau and Hamermesh, 2001) from one endeavor—the measurement of the variety of activities—suggests, however, that including secondary activities (from time budgets from Australia, Germany and Sweden) has little qualitative effect on inferences about behavior.

Table 1 presents monetary expenditures on goods (per month in the local currency in the survey year) and time expenditures (hours per month) used in commodity production in both countries.[6] For each country the final column in the table shows the ratio of goods to time inputs relative to the ratio of the total amount of goods and time allocated to commodity production.[7] Out of 1440 hours per couple per month, 264 hours remain unallocated in the U.S., and 248 hours in Israel, because they are devoted to market work. Only 9 percent of goods expenditures in the U.S. and 2 percent in Israel cannot be included in the calculations. Of the rest, 99 percent of expenditures in the U. S. and 96 percent in Israel are allocated to producing the eight specific commodities. We thus allocate 90 and 94 percent of spending to the specific commodities in the two countries.

There are striking similarities between the two countries in the relative goods intensities of the commodities. LODGING is relatively goods intensive—maintaining a house, including rentals, mortgage payments and the purchases of appliances and other capital, takes relatively large shares of expenditure compared to the time inputs into home maintenance. In contrast the average family spends about 10 percent of its day shopping for and preparing food, eating and cleaning up (with time inputs in this activity being one-half those of LEISURE activities). Still, the time inputs are small compared to the inputs of goods, making EATING relatively goods intensive. TRAVEL is often regarded as a time consuming activity; despite that we observe that this commodity is no more time intensive than EATING. We spend substantial amounts of money on our autos and on public transportation compared to the amount of time we use them.[8]

[6]The time diaries are weighted so that the averages represent the seven days of the week equally.

[7]The weighted mean of the relative goods intensities (where the weight is the fraction of time going into the activity) equals, of course, one.

[8]Comparing the absolute time inputs into TRAVEL with other activities (e.g., EATING), one should recall that commuting time was allocated to market work and is not reported in Table 1. This does not affect the calculation of the relative goods intensity of this activity.

The most goods-intensive activity in both countries is HEALTH. Remarkably little time is spent being sick or directly in health-related activities (as opposed to those that might be viewed partly as investments in health, such as participatory sporting activities). If we were to include public expenditures on health care, which are in the end financed out of the tax dollars that we cannot include in the household's total expenditures, this commodity would appear even more goods intensive.

By construction SLEEP is the least relatively goods-intensive commodity. Along with LEISURE it accounts for 67 percent of all the time spent in household production in both countries. The remarkably similar estimates of the relative goods intensity of LEISURE in the two countries' data suggest that LEISURE is the least goods-intensive commodity of those to which we allocate expenditures. Leisure is not the complement of market work, as the amounts of time allocated to other commodities should indicate. Rather, it is a way of using time that requires the smallest expenditure on goods whose purchase is financed mostly by earnings in market work.

**IV. Correlates of Goods Intensity—Education and Age**

Consider variations in the relative goods intensities of commodities with the most well known correlates of earnings, education and age. Table 2 shows time and goods inputs into each commodity by educational attainment of the husband.[9] In order to maintain comparability across the two countries, educational attainment is classified into "thirds," with the top third in both countries being men who have gone beyond high school, the middle third being a high school diploma in the U.S., but any high school in Israel, and the lowest third being 0-11 years in the

[9]None of the major conclusions of this Section changes if we classify the relative goods intensities of the commodities according to the wife's education or age.

U.S., 0-8 years in Israel.[10] Relative goods intensities are normalized so that the relative goods intensity of production is unity for the average household.

The unsurprising positive relation between education and earnings is implied by the increase in total expenditure with husband's income shown at the bottom of the "Goods" columns for each country. Because of this increase, and also because the time devoted to household production decreases with education (obversely, as is well known, market work time increases), the goods intensity of household production in general rises with education, increasing by 78 percent between the Low and High education groups in the U.S. and by 58 percent in Israel. Of this increase most is due to increased purchases of market goods. Moving from the Low to the High education group in the U.S., 94 percent of the increase in the goods intensity of household production is due to increased goods purchases and only 6 percent to decreased time spent in the household (allocating less time to household production). In Israel the shares are somewhat more equal, 79 percent and 21 percent.

For many commodities the goods intensity just reflects the income-schooling profile and the expenditure elasticities of goods purchases. This is true for LODGING, APPEARANCE and, to a lesser degree, EATING. Food preparation and eating time decline with schooling. As a result the relative goods-intensities increase more rapidly than do goods expenditures. The same is true for LEISURE. The increasing relative goods intensity of LEISURE derives mostly from the very sharp increase in purchases of leisure goods with education. Time inputs into leisure production, however, decrease with education (by over 10 percent between the Low and High education groups in the U. S., by nearly 25 percent in Israel), contributing a substantial part of the increasing relative goods intensity of LEISURE production with education. There is no

[10]In the U.S. 19 percent of husbands in the usable CES have less than a high-school education, 33 percent have a high-school diploma, and 48 percent have more than 12 years of education. In Israel 14 percent have 0 to 8 years of education, 42 percent have 9 to 12 years, and 44 percent have more than 12 years.

steady increase with education in the relative goods intensity of TRAVEL. Once one moves beyond the lowest education level, goods and time inputs into travel move in proportion to changes in the average goods and time inputs into all home-produced commodities.[11]

The results for CHILDCARE are especially revealing. Although the goods expenditure elasticity of this commodity is significantly above unity (1.50 in Israel, 1.75 in the U.S.), except for the anomaly of the middle-education group in the U.S. the relative goods intensity barely changes with education. Parents match increased expenditures hour for dollar, underscoring the importance of parents' schooling for the development of their children. The literature emphasizes the substitution of money for time where parents opt for a lower quantity and compensate by increasing the quality of children. Surprisingly, we cannot find any evidence to support this claim in the U.S. or the Israeli data. In both countries the greater demand for quality leads to higher expenditures of both goods and time.

The main general inference from this table is that there are consistent patterns of changing relative goods intensities with the accumulation of additional human capital in many of the major commodities that households produce. While relative changes in the amounts of purchased goods account for the greater share of the changes in relative goods intensities, differences in the extent of substitution against time inputs in the production of these commodities generate part of these patterns.

Table 3 presents the average time and goods inputs and the relative goods intensities of the commodities by husband's age. We choose four age groups—20-34, 35-44, 45-54 and 55-70—in order to maximize the smallest cell size in the time-budget studies yet still generate useful variation in age. Total expenditure by age mirrors typical age-earnings profiles, rising sharply from young adults to prime-age couples, constant among early middle-age couples, then

[11] A shift from public to private transport explains the rapid increase in travel expenditures with schooling in Israel.

lower among late middle-age couples. Time devoted to non-market production is almost constant across the three younger age groups, but much higher among couples with a husband age 55-70 because market work hours decline with age. The net result is that the relative goods intensity of household production rises up through age 54, almost entirely due to increasing inputs of purchased goods. After age 54 the relative goods intensity is the lowest in the sample, partly because expenditures are lower, but partly too because time inputs into household production increase. In the U.S. the decrease in goods inputs accounts for 70 percent of the 27-percent decline in the goods intensity of production between ages 45-54 and 55-70. The comparable figure for Israel is a remarkably similar 71 percent of the 30-percent decline in goods intensity. Unlike the differences among commodities in the relationship between education and the relative goods intensities shown in Table 2, changes in the relative goods intensity of different commodities with age generally mirror the overall inverse-U shaped relationship between goods intensity and age.[12]

One noteworthy exception is the relative goods intensity of CHILDCARE. Its age profile is driven by the age-time allocation profile. Unsurprisingly, time spent on this activity decreases steadily with age, whereas goods purchases peak at ages 35-44 and decline only slowly for the next ten years. As a result, we observe a sharp rise in the goods intensity up to ages 45-54. The only other commodity with such a steep increase is HEALTH.

**V. Total Time Inputs**

One of Becker's (1965) major lessons is that the ultimate constraint facing the household is the "full time constraint," where "full time" is defined as the total time available (e.g., 24 hours per day) and the time-equivalent of unearned income. By analogy, the time expenditure on each of the commodities is composed of the direct "home" time and the indirect market time—

[12]Tables by age and education are available upon request from the second author.

that is, the market work time required to earn income to finance expenditures on goods used in the production of the commodity. To compute this component one has to deflate the goods expenditures by the household's average wage (earnings averaged over all working hours sold in the market).

The application of this concept is complicated by the existence of savings and by poor information on unearned income. To circumvent this difficulty we deflate using the "average expenditures per hour of market work." The results are shown in Table 4, which presents the direct and indirect time inputs going into each activity as percentages of total home time and total market time, respectively, for the three schooling classes. Adding the home time and market components to obtain the fraction of each activity in total time (1440 hours a month), we find that "necessities," such as SLEEP, LODGING, APPEARANCE and EATING, occupy almost 60 percent of the household's time. One third of all time goes to LEISURE, with the residual allocated to CHILDCARE, HEALTH and MISCELLANEOUS.[13] Peculiarly, the shares of total time going into the individual activities are hardly affected by the husband's schooling. In spite of the relatively large variations among schooling groups in the goods intensities of the different commodities, their shares in total time are almost identical.

Applying a similar measure to the age-consumption profile, in Table 5 we observe that the concave shape of the age-expenditure profile in Table 3 is accounted for almost entirely by the change in wages (or more accurately, expenditure per unit of labor). Household home time barely responds to the 25-40 percent increase in the price of time. The age profile of total consumption, evaluated at "full cost," is by construction constant (at 1440 hours per month). What is interesting, however, is that the shares of most commodities remain constant over the

[13]The low share of total time devoted to CHIDCARE reflects the low incidence of children in the sample. Controlling in the Israeli sample for the existence of children (less than age 18), the fraction grows to 6 percent, and in families with young children (less than 6) it is even higher (8 percent). This time comes mostly at the expense of LEISURE and increases consistently with schooling.

life cycle. The only one whose consumption declines over the life cycle is, naturally, CHILDCARE, with hours released from this activity fully absorbed in LEISURE and TRAVEL. Variations in the goods intensities of the activities and changes in the price of time over schooling groups and over the life cycle hardly affect the distribution of "full income." It is as if the distribution is determined in a two-stage budgeting process.

## VI. Conclusions and Implications

The absence of surveys reporting households' allocation of money and time together and early criticism concerning the applicability of Becker's theory of home production (Pollak and Wachter, 1975, restated and expanded by Pollak, 2002) have discouraged attempts to explore further the nature of this production process. Thus, while the model triggered dozens of studies of household behavior and many applications outside labor economics, knowledge of the broad outlines of the production process, such as input intensity and cost structure, is as sparse today as it was four decades ago.[14] Our attempt to measure the relative goods intensities and estimate the "full costs" of the various commodities and their shares in "full income" is, therefore, a venture into uncharted territory. At the end of this brief trip it seems that taking the theory more seriously has its rewards. We returned with several intriguing observations and at least one finding that challenges the accepted wisdom.

We took data on time use and goods expenditures for the United States and Israel and created a complete set of accounts for household production for the two countries. They demonstrate that certain commodities, particularly lodging, health and travel, are relatively goods intensive to produce, while leisure activities are relatively time intensive. The accounts also demonstrate that additional education (and thus income) generates especially large increases in the relative goods intensity of leisure and lodging. Moreover, despite common belief, additional

[14]This absence does not apply to some specific aspects of home production (e.g., health, and child nutrition), where research has been quite successful in establishing the relationship between inputs and outcomes.

education does not alter the relative goods intensity of childcare—more educated parents do not cut back on their time inputs to children as they increase their spending on children. The shares of the various expenditure groups in money income change with schooling and over the life cycle. Adopting a broader measure of costs, we find that the shares of commodities in total time, when they are evaluated at their "full" time costs, are hardly affected by these variables. Regardless of their schooling (and material wealth), through most of their lifetime households spend about two-thirds of their time on essentials (LODGING, APPEARANCE, EATING, and SLEEP) and about one-third on LEISURE and TRAVEL. The only observable change in this pattern as the household ages is an increase in LEISURE at the expense of CHILDCARE.

Our exercise is based on two relatively small samples. The increased availability of large time use surveys in the West, particularly the new American Time Use Survey, will eventually allow verifying some of the patterns observed here. The results are governed to a large extent by income differences among the age-schooling groups and by the relevant income elasticities. Differences between standards of living (i.e., household expenditures) in the U.S. and Israel may be too small to reach still more general conclusions. For example, the similar rankings of the relative goods intensities of LODGING and APPEARANCE may reflect Western technology that has already embedded advanced economies' relative goods and time prices. Replicating our exercise for LDCs would allow for a still more telling examination of the theory.

The results may provide grist for a variety of mills in economic research. In public economics, for example, the increase in the relative goods intensity of the production of leisure as education increases could be used to draw better inferences about the full incidence of commodity taxation, and about how that incidence varies differentially with income. Trade models can be modified to generate changes in international trade flows through changing relative time prices even if underlying preference structures remain unchanged. Macroeconomic

models that distinguish between leisure and market work might expand the distinction to include several non-market activities that exhibit different relative goods intensities. Those differences could be used as inputs into more accurate modeling of the determinants of cycles in market production. Similarly, new growth models might make additional progress by accounting for the changing mix of relative goods intensities across countries as their relative incomes change. The millstones created here can help to generate more finely ground results than could be possible without accounting for the interactions of goods and time in household production.

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## APPENDIX

Table A1 presents the categorizations of time and expenditures for the United States and Israel. Arbitrary decisions include distributing purchases of major and miscellaneous appliances equally across LODGING, APPEARANCE and CHILDCARE; including half of alcohol purchases as producing EATING, half as producing LEISURE; prorating purchased health care between HEALTH and CHILDCARE based on couples' time spent in generating children's health; and including purchased educational services as LEISURE if the couple is age 60 or over, as MISCELLANEOUS otherwise. Illustrating the inherent difficulties in choosing how to allocate activities, a minor, but interesting decision must be made about the category "Private, sex, making out, none of your business." We have included this in LEISURE.

**Table 1. Production of Commodities, United States 1985, Israel 1992**

| | UNITED STATES | | | ISRAEL | | |
|---|---|---|---|---|---|---|
| | TIME (Hrs/Month) | GOODS (Monthly $) | Relative Goods/Time Intensity | TIME (Hrs/Month) | GOODS (Monthly ?) | Relative Goods/Time Intensity |
| SLEEP | 485 | 0 | 0 | 469 | 0 | 0 |
| LODGING | 76 | 680 | 5.39 | 55 | 1,925 | 6.88 |
| APPEARANCE | 65 | 153 | 1.42 | 45 | 385 | 1.69 |
| EATING | 145 | 403 | 1.67 | 127 | 1,175 | 1.82 |
| CHILDCARE | 22 | 47 | 1.27 | 53 | 395 | 1.48 |
| LEISURE | 299 | 179 | 0.36 | 333 | 740 | 0.44 |
| HEALTH | 4 | 92 | 12.35 | 8 | 424 | 10.73 |
| TRAVEL | 60 | 364 | 3.63 | 71 | 723 | 2.02 |
| MISCELLANEOUS | 19 | 37 | 1.16 | 32 | 270 | 1.68 |
| TOTAL | 1176 | 1,954 | 1.00 | 1192 | 6,037 | 1.00 |
| TOTAL POSSIBLE | 1440 | 2,141 | | 1440 | 6,139 | |

**Table 2. Commodity Production by Educational Attainment, United States 1985, Israel 1992**

| | | UNITED STATES | | | ISRAEL | | |
|---|---|---|---|---|---|---|---|
| ? | Husband's Education | TIME (Hrs/Month) | GOODS (Monthly $) | Relative Goods/Time Intensity | TIME (Hrs/Month) | GOODS (Monthly ?) | Relative Goods/Time Intensity |
| SLEEP | Low | 495 | 0 | 0 | 502 | 0 | 0 |
| | Middle | 483 | 0 | 0 | 471 | 0 | 0 |
| | High | 484 | 0 | 0 | 456 | 0 | 0 |
| LODGING | Low | 81 | 424 | 3.17 | 67 | 1439 | 4.25 |
| | Middle | 74 | 559 | 4.57 | 57 | 1777 | 6.19 |
| | High | 76 | 859 | 6.79 | 50 | 2216 | 8.78 |
| APPEARANCE | Low | 63 | 88 | 0.83 | 45 | 349 | 1.53 |
| | Middle | 66 | 130 | 1.19 | 47 | 383 | 1.62 |
| | High | 64 | 194 | 1.82 | 44 | 397 | 1.80 |
| EATING | Low | 160 | 327 | 1.23 | 150 | 1123 | 1.48 |
| | Middle | 148 | 374 | 1.53 | 124 | 1131 | 1.80 |
| | High | 139 | 451 | 1.96 | 122 | 1230 | 1.99 |
| CHILDCARE | Low | 9 | 21 | 1.42 | 29 | 221 | 1.53 |
| | Middle | 24 | 33 | 0.83 | 50 | 370 | 1.46 |
| | High | 24 | 65 | 1.62 | 63 | 472 | 1.49 |
| LEISURE | Low | 318 | 109 | 0.21 | 401 | 614 | 0.30 |
| | Middle | 310 | 170 | 0.33 | 339 | 728 | 0.42 |
| | High | 283 | 213 | 0.45 | 305 | 789 | 0.51 |
| HEALTH | Low | 5 | 79 | 9.54 | 17 | 379 | 4.30 |
| | Middle | 1 | 88 | 36.51 | 8 | 384 | 10.11 |
| | High | 7 | 99 | 8.42 | 5 | 477 | 20.93 |
| TRAVEL | Low | 53 | 286 | 3.26 | 56 | 472 | 1.65 |
| | Middle | 56 | 346 | 3.71 | 68 | 684 | 2.00 |
| | High | 66 | 406 | 3.69 | 79 | 837 | 2.10 |
| MISC. | Low | 22 | 18 | 0.49 | 18 | 141 | 1.52 |
| | Middle | 16 | 30 | 1.17 | 20 | 194 | 1.93 |
| | High | 19 | 49 | 1.55 | 47 | 385 | 1.61 |
| TOTAL | Low | 1205 | 1,352 | 0.68 | 1286 | 4738 | 0.73 |
| | Middle | 1180 | 1,731 | 0.88 | 1182 | 5651 | 0.94 |
| | High | 1162 | 2,337 | 1.21 | 1169 | 6803 | 1.15 |

NOTE: Low is 0-11 years in the U.S., 0-8 in Israel; middle is 12 years in the U.S, 9-12 in Israel; high is >12 years in both countries.

**Table 3. Commodity Production by Age Group, United States 1985, Israel 1992**

| | | UNITED STATES | | | ISRAEL | | |
|---|---|---|---|---|---|---|---|
| | Husband's Age | TIME (Hrs/Month) | GOODS (Monthly $) | Relative Goods/Time Intensity | TIME (Hrs/Month) | GOODS (Monthly ?) | Relative Goods/Time Intensity |
| SLEEP | 20-34 | 494 | 0 | 0 | 483 | 0 | 0 |
| | 35-44 | 475 | 0 | 0 | 459 | 0 | 0 |
| | 45-54 | 474 | 0 | 0 | 456 | 0 | 0 |
| | 55-70 | 488 | 0 | 0 | 475 | 0 | 0 |
| LODGING | 20-34 | 63 | 668 | 6.38 | 45 | 1,621 | 7.11 |
| | 35-44 | 75 | 790 | 6.32 | 51 | 2,078 | 8.09 |
| | 45-54 | 84 | 698 | 5.00 | 55 | 2,135 | 7.72 |
| | 55-70 | 85 | 562 | 3.97 | 68 | 1,832 | 5.31 |
| APPEARANCE | 20-34 | 62 | 125 | 1.22 | 41 | 312 | 1.50 |
| | 35-44 | 66 | 164 | 1.49 | 44 | 376 | 1.68 |
| | 45-54 | 65 | 187 | 1.74 | 47 | 492 | 2.05 |
| | 55-70 | 68 | 148 | 1.31 | 47 | 371 | 1.56 |
| EATING | 20-34 | 131 | 327 | 1.50 | 107 | 933 | 1.72 |
| | 35-44 | 141 | 454 | 1.94 | 118 | 1,268 | 2.12 |
| | 45-54 | 140 | 466 | 2.01 | 127 | 1,374 | 2.14 |
| | 55-70 | 174 | 387 | 1.34 | 154 | 1,106 | 1.42 |
| CHILDCARE | 20-34 | 42 | 30 | 0.43 | 104 | 383 | 0.73 |
| | 35-44 | 31 | 78 | 1.51 | 75 | 548 | 1.45 |
| | 45-54 | 6 | 71 | 7.41 | 20 | 447 | 4.39 |
| | 55-70 | 2 | 13 | 3.88 | 12 | 168 | 2.83 |
| LEISURE | 20-34 | 273 | 162 | 0.36 | 278 | 639 | 0.45 |
| | 35-44 | 280 | 208 | 0.45 | 290 | 850 | 0.58 |
| | 45-54 | 299 | 199 | 0.40 | 343 | 852 | 0.49 |
| | 55-70 | 350 | 153 | 0.26 | 420 | 596 | 0.28 |
| HEALTH | 20-34 | 4 | 63 | 9.50 | 7 | 318 | 8.72 |
| | 35-44 | 7 | 80 | 7.29 | 5 | 426 | 16.49 |
| | 45-54 | 2 | 103 | 26.67 | 4 | 510 | 27.97 |
| | 55-70 | 5 | 129 | 16.56 | 14 | 447 | 6.26 |
| TRAVEL | 20-34 | 66 | 339 | 3.08 | 69 | 609 | 1.74 |
| | 35-44 | 60 | 392 | 3.95 | 85 | 740 | 1.71 |
| | 45-54 | 55 | 405 | 4.40 | 68 | 883 | 2.58 |
| | 55-70 | 58 | 331 | 3.45 | 58 | 668 | 2.27 |
| MISC. | 20-34 | 23 | 22 | 0.58 | 42 | 208 | 0.98 |
| | 35-44 | 17 | 30 | 1.06 | 36 | 237 | 1.29 |
| | 45-54 | 15 | 63 | 2.51 | 29 | 353 | 2.37 |
| | 55-70 | 21 | 40 | 1.13 | 22 | 300 | 2.74 |
| TOTAL | 20-34 | 1157 | 1,735 | 0.90 | 1176 | 5,023 | 0.84 |
| | 35-44 | 1153 | 2,196 | 1.15 | 1163 | 6,523 | 1.11 |
| | 45-54 | 1140 | 2,191 | 1.16 | 1148 | 7,046 | 1.21 |
| | 55-70 | 1251 | 1,762 | 0.85 | 1270 | 5,488 | 0.85 |

**Table 4. Distribution of Total Time Inputs in Commodity Production by Educational Attainment, United States, 1985, Israel, 1992**

| | UNITED STATES | | | ISRAEL | | |
|---|---|---|---|---|---|---|
| Husband's Education | HOME TIME (%) | MARKET TIME (%) | TOTAL TIME (%) | HOME TIME (%) | MARKET TIME (%) | TOTAL TIME (%) |
| SLEEP | | | | | | |
| Low | 41.0 | 0.0 | 34.3 | 39.0 | 0.0 | 34.8 |
| Middle | 41.0 | 0.0 | 33.5 | 39.8 | 0.0 | 32.7 |
| High | 41.6 | 0.0 | 33.6 | 39.0 | 0.0 | 31.6 |
| LODGING | | | | | | |
| Low | 6.7 | 31.4 | 10.7 | 5.2 | 30.4 | 7.9 |
| Middle | 6.3 | 32.3 | 11.0 | 4.8 | 31.4 | 9.6 |
| High | 6.5 | 36.8 | 12.4 | 4.3 | 32.6 | 9.6 |
| APPEARANCE | | | | | | |
| Low | 5.3 | 6.5 | 5.5 | 3.5 | 7.4 | 3.9 |
| Middle | 5.6 | 7.5 | 5.9 | 4.0 | 6.8 | 4.5 |
| High | 5.5 | 8.3 | 6.1 | 3.7 | 5.8 | 4.1 |
| EATING | | | | | | |
| Low | 13.2 | 24.2 | 15.0 | 11.7 | 23.7 | 13.0 |
| Middle | 12.5 | 21.6 | 14.2 | 10.5 | 20.0 | 12.2 |
| High | 11.9 | 19.3 | 13.4 | 10.4 | 18.1 | 11.9 |
| CHILDCARE | | | | | | |
| Low | 0.7 | 1.6 | 0.9 | 2.2 | 4.7 | 2.5 |
| Middle | 2.1 | 1.9 | 2.0 | 4.2 | 6.5 | 4.7 |
| High | 2.1 | 2.8 | 2.2 | 5.4 | 6.9 | 5.7 |
| LEISURE | | | | | | |
| Low | 26.4 | 8.1 | 23.4 | 31.2 | 13.0 | 29.3 |
| Middle | 26.3 | 9.8 | 23.3 | 28.7 | 12.9 | 25.8 |
| High | 24.3 | 9.1 | 21.4 | 26.1 | 11.6 | 23.4 |
| HEALTH | | | | | | |
| Low | 0.4 | 5.9 | 1.3 | 1.4 | 8.0 | 2.1 |
| Middle | 0.1 | 5.1 | 1.0 | 0.6 | 6.8 | 1.7 |
| High | 0.6 | 4.2 | 1.3 | 0.4 | 7.0 | 1.6 |
| TRAVEL | | | | | | |
| Low | 4.4 | 21.2 | 7.1 | 4.4 | 10.0 | 5.0 |
| Middle | 4.8 | 20.0 | 7.5 | 5.7 | 12.1 | 6.9 |
| High | 5.7 | 17.4 | 8.0 | 6.7 | 12.3 | 7.8 |
| MISC. | | | | | | |
| Low | 1.8 | 1.3 | 1.8 | 1.4 | 3.0 | 1.6 |
| Middle | 1.3 | 1.7 | 1.4 | 1.7 | 3.4 | 2.0 |
| High | 1.6 | 2.1 | 1.7 | 4.0 | 5.7 | 4.3 |
| TOTALS (All 100.0%) | | | | | | |
| Total | 81.7 | 18.3 | 100.0 | 82.8 | 17.2 | 100.0 |

**Table 5. Distribution of Total Time Inputs in Commodity Production by Age Group, United States, 1985, Israel, 1992**

| | UNITED STATES | | | ISRAEL | | |
|---|---|---|---|---|---|---|
| Husband's Age | HOME TIME (%) | MARKET TIME (%) | TOTAL TIME (%) | HOME TIME (%) | MARKET TIME (%) | TOTAL TIME (%) |
| SLEEP | | | | | | |
| 20-34 | 42.7 | 0.0 | 34.3 | 41.1 | 0.0 | 33.6 |
| 35-44 | 41.2 | 0.0 | 33.0 | 39.5 | 0.0 | 31.9 |
| 45-54 | 41.6 | 0.0 | 32.9 | 39.7 | 0.0 | 31.6 |
| 55-70 | 39.0 | 0.0 | 33.9 | 37.4 | 0.0 | 33.0 |
| LODGING | | | | | | |
| 20-34 | 5.4 | 38.5 | 11.9 | 3.8 | 32.3 | 9.0 |
| 35-44 | 6.5 | 36.0 | 12.4 | 4.4 | 31.9 | 9.6 |
| 45-54 | 7.4 | 31.8 | 12.5 | 4.8 | 30.3 | 9.9 |
| 55-70 | 6.8 | 31.9 | 10.1 | 5.4 | 33.4 | 8.7 |
| APPEARANCE | | | | | | |
| 20-34 | 5.3 | 7.2 | 5.7 | 3.5 | 6.2 | 4.0 |
| 35-44 | 5.8 | 7.5 | 6.1 | 3.8 | 5.8 | 4.2 |
| 45-54 | 5.7 | 8.5 | 6.3 | 4.1 | 7.0 | 4.7 |
| 55-70 | 5.4 | 8.4 | 5.8 | 3.7 | 6.8 | 4.1 |
| EATING | | | | | | |
| 20-34 | 11.3 | 18.8 | 12.8 | 9.1 | 18.6 | 10.8 |
| 35-44 | 12.2 | 20.7 | 13.9 | 10.1 | 19.4 | 11.9 |
| 45-54 | 12.3 | 21.3 | 14.1 | 11.0 | 19.5 | 12.7 |
| 55-70 | 13.9 | 22.0 | 15.0 | 12.1 | 20.2 | 13.1 |
| CHILDCARE | | | | | | |
| 20-34 | 3.6 | 1.7 | 3.3 | 8.8 | 7.6 | 8.6 |
| 35-44 | 2.7 | 3.6 | 2.9 | 6.4 | 8.4 | 6.8 |
| 45-54 | 0.5 | 3.2 | 1.1 | 1.8 | 6.3 | 2.7 |
| 55-70 | 0.2 | 0.7 | 0.2 | 0.9 | 3.1 | 1.2 |
| LEISURE | | | | | | |
| 20-34 | 23.6 | 9.3 | 20.8 | 23.6 | 12.7 | 21.6 |
| 35-44 | 24.3 | 9.5 | 21.4 | 24.9 | 13.0 | 22.6 |
| 45-54 | 26.2 | 9.1 | 22.6 | 29.9 | 12.1 | 26.3 |
| 55-70 | 28.0 | 8.7 | 25.4 | 33.1 | 10.9 | 30.5 |
| HEALTH | | | | | | |
| 20-34 | 0.3 | 3.6 | 1.0 | 0.6 | 6.3 | 1.7 |
| 35-44 | 0.6 | 3.7 | 1.2 | 0.4 | 6.5 | 1.6 |
| 45-54 | 0.2 | 4.7 | 1.1 | 0.3 | 7.2 | 1.7 |
| 55-70 | 0.4 | 7.3 | 1.3 | 1.1 | 8.1 | 1.9 |
| TRAVEL | | | | | | |
| 20-34 | 5.7 | 19.5 | 8.4 | 5.9 | 12.1 | 7.0 |
| 35-44 | 5.2 | 17.8 | 7.7 | 7.3 | 11.3 | 8.1 |
| 45-54 | 4.9 | 18.5 | 7.7 | 5.9 | 12.5 | 7.2 |
| 55-70 | 4.6 | 18.8 | 6.5 | 4.6 | 12.2 | 5.5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MISC. | | | | | | |
| 20-34 | 2.0 | 1.3 | 1.8 | 3.5 | 4.1 | 3.7 |
| 35-44 | 1.5 | 1.4 | 1.5 | 3.1 | 3.6 | 3.2 |
| 45-54 | 1.3 | 2.9 | 1.7 | 2.6 | 5.0 | 3.1 |
| 55-70 | 1.7 | 2.3 | 1.8 | 1.7 | 5.5 | 2.1 |
| TOTALS (All 100.0 %) | | | | | | |
| Total | 81.7 | 18.3 | 100.0 | 82.8 | 17.2 | 100.0 |

**Appendix Table 1. Definitions of Commodities, United States, 1985, Israel, 1992**[1]

| COMMODITY | TIME USE CATEGORY |
|---|---|
| SLEEP | Night sleep, naps and resting[2] |
| LODGING | House cleaning, outdoor chores, home and car repairs, gardening and animal care, durable goods shopping, misc. household duties. |
| APPEARANCE | Laundry and clothes care, personal and beauty care, personal hygiene |
| EATING | Meal preparation and clean-up, grocery shopping, eating at home and away |
| CHILDCARE | If kids>0: All infant and childcare non-travel activities |
| LEISURE | Sex, nonreligious orgztns., entertainment, culture, visits, social events, sports, hobbies, crafts, games, reading, writing, TV & radio, conversing, relaxing/thinking[2] |
| HEALTH | Medical care at home and at doctors |
| TRAVEL | Nonwork + education-related (if age>59) |
| MISC. | Misc. errands, volunteering and relig. orgztns., time spent caring for other adults, and for children (if kids=0) |

| COMMODITY | GOODS EXPENDITURE CATEGORY |
|---|---|
| SLEEP | |
| LODGING | HOUSING - .667* (Major Appliances + Misc. Appliances) – Small Appliances |
| APPEARANCE | APPAREL AND SERVICES +.33*(Major Appliances + Misc. Appliances) + PERSONAL CARE - Boys' and Girls' Apparel (if kids>0) |
| EATING | FOOD + .5*ALCOHOL+.33*(Major Appliances + Misc. Appliances) + Small Appliances |
| CHILDCARE | If kids>0: Boys' & Girls' Apparel + EDUCATION + HEALTHCARE prorated by medical care time with children divided by that plus own medical care time |
| LEISURE | ENTERTAINMENT + READING + TOBACCO + .5*ALCOHOL (+EDUCATION if kids=0 & both spouses >59 |
| HEALTH | If kids=0: HEALTH CARE; if kids>0, HEALTHCARE prorated by own medical care time divided by that plus medical care time with children |
| TRAVEL | TRANSPORTATION prorated by nonwork travel divided by total travel |
| MISC. | MISCELLANEOUS+CASH CONTRIBUTIONS + EDUCATION(if kids=0 & <60) + Boys'& Girls' Apparel (if kids=0) |

[1]Accounts for all time except work, work-related travel, and education and education-related travel (if age<60), and for all spending except pension and insurance, education (if kids=0 and either husband or wife age< 60), and prorated (by travel time).

[2]In the U.S. data rest is included in SLEEP; in the Israeli data, it is included in LEISURE.