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Cheaper by the dozen

Economies of scale in domestic work

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ABSTRACT

Cheaper by the dozen – Economies of scale in domestic work.
Kristiina Aalto, Johanna Varjonen, National Consumer Research
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Intra-family distribution of resources is an important factor of family well-being. Different equivalence scales (e.g. consumer units) have been produced and used to adjust the economic resources of households with different characteristics. However, these studies ignore time as an intra-family resource. Time use as an element of household production can be examined taking into account the household size. In this paper we will explore the economies of scales in domestic work time.

The paper examines how the total domestic work time of the family is affected by the size and structure of the family, and what kind of economies of scale can be found. Particularly we focus on childcare, food preparation, laundry and cleaning. Additionally, we examine how family size affects the mother's, father's and children's share of domestic work time. We analyse the Finnish time use data collected by Statistics Finland (1999-2000). For our study the individual-based data were reorganized into household based-data as the sum of the time use of family members.

The results indicate, firstly, that the time for domestic work increases with family size, yet, in general, it decreases per family member. However, the couples offer an interesting exception. They use more time per person to domestic work than singles. Secondly, the mother's and father's share of housework time decreases with family size. Thirdly, the changes in time use vary by household task. Biggest benefits are gained in childcare and laundry. Finally, we will discuss the importance of family size when analysing domestic work and its intra-family allocation.

Keywords:

Households, house work, home economics, family life, time management, economic behaviour

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1 INTRODUCTION

Discussion about families' time use is increasingly marked by talk about a lack of time. This is the case particularly in families with children. Families naturally try to take care of domestic work as they think best, dividing tasks among family members and buying services from outside. Yet we know very little about how domestic work time actually changes when we move from small households to larger ones. More housework time is needed in large families, of course, but how much? What kind of economies of scales could be found in the households, and how could those be measured and demonstrated?

Household expenditure for different-sized households, for example, is measured and illustrated by so-called equivalence scales, that is, adjusted consumption units developed for the purpose. Equivalence scales make it possible to produce nationally and internationally commensurate data on families' living standards. Income and household consumption cannot be defined in terms of 'per capita', as divided by the number of members of a household, because many commodities are used jointly. Living space and household appliances are examples of such commodities. Therefore it is evident that larger households reach the same living standard with a relatively smaller income than smaller households. What about household time use? Would it be possible to determine equivalence scales also for domestic work time?

Little research has been done on this aspect of time use, probably due to the lack of suitable empirical data. Domestic work time in households of varying sizes is reported in the Finnish Housework Study for 1979 (Säntti et al. 1982) and in a Bulgarian time use survey (Staikov 1992). According to the Finnish data, the time use per person decreased as the size of household grew. Staikov's results from the year 1988 showed similarly that one- and two-member households used the most time and four-member households the least time per person for domestic tasks. On the other hand, households with five or more members spent approximately as much time on housework per person as households with three members. At least a four-member Bulgarian household appeared thus to obtain economies of scale, although these economies of scale diminished as the household size grew further.

This paper examines the economics of scale in time use of the Finnish households in 1999-2000. The data used were provided by the European harmonised time use survey, which covered time use by all household members over 10 years. This gave the opportunity to make a new estimation for Finland. The aim of our study is to examine the effects of household size on domestic work time, and the structural factors behind those effects. Does the average time used for domestic work diminish as household size increases? Are there differences between different tasks? Our study also investigates how an increase in family size affects the division of domestic work between parents. We first describe the total domestic work time in households and then separately the time used for food management, laundry, housecleaning, childcare, household maintenance, and shopping and errands. The time examined here is primary time for domestic work, no secondary time is taken into account.

2 METHOD AND DATA

The data for the study are derived from the time use survey by Statistics Finland in 1999–2000. The materials comprise 4420 time diary days from 2240 Finnish households. All household members aged 10 years or more kept the diaries (table 1). The total domestic time of a household was calculated as a sum of the minutes used to domestic work by its members. About a half of the persons living alone or in couples, who were at working age, were under 45 years old. The largest households are grouped together in a size category “6+”, in which the average number of household members is 6,7.

TABLE 1. Household sizes and household types of the data

Household size Household type	1	2	3	4	5	6+	Study days
Single-parent families	0	7%	8%	1%	0	0	165 4%
Two-parent families with children aged 0–6 years	0	0	28%	45%	46%	57%	589 13%
Two-parent families with children aged 7–17 years	0	0	29%	46%	48%	28%	588 13%
Working aged (–64 yrs) single households and couples	71%	65%	0	0	0	0	1 935 44%
Pensioners (65+ yrs) single households and couples	29%	22%	0	0	0	0	717 16%
Other households	0	7%	35%	9%	6%	15%	426 10%
All households	100% 1 177 27%	100% 1 699 38%	100% 658 15%	100% 556 13%	100% 256 6%	100% 74 2%	4 420 100%

3 DOMESTIC WORK TIME IN DIFFERENT-SIZED HOUSEHOLDS

Let us first look at the overall change in time use with increasing household size. Figure 1 shows the change in average domestic work time per household and per person in all households.

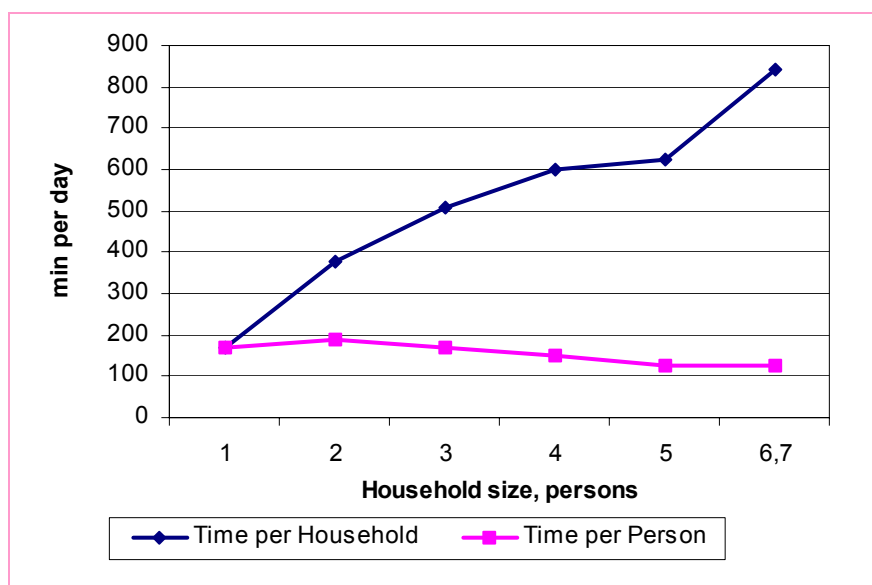


FIGURE 1. Domestic work time per household and per person

As we move from a single to a two-member household, domestic work time slightly increases: not only per household but also per person. Time use per household grows steadily up to three- and four-member households, after which it increases only little for households with five members. In the largest households with an average of 6.7 members, time use again appears to grow more.

We can see two interesting points. Firstly, when we move from a single-person household to a two-member household the domestic work time more than doubles, that is, also time per person increases. There seems to be no economies of scales. Why is this? Probably persons living as couples lead a more “domestic” life – they cook more at home, and furnish and clean the home more than persons living alone. The second interesting point is that the five-member households spend the least time on domestic work per person. So, there appears to be clear economies of scale to be gained as we move to households with three, then to four and to five members, after which point the benefit of scale stops growing. The households with five members spend the least time on domestic work per person, whereas the large (6+) households spend slightly more time per person. These results are in line with the previous Finnish results (Säntti et al. 1982). The domestic work time per household has remained surprisingly same when we compare households of equal size. It has dropped only in single households and in two-parent families with one child. In the 1999–2000 data, the two-member households spent the

most time on domestic work per person, though again two decades earlier the time use was greatest in single households. This finding seems to follow the same trend as in Staikov's (1992) study, the only difference being that Staikov found the greatest benefit already in four-member households. Again, the connection between household size and housework time is discussed in Canada where Colman (1998, 81) argues that there has been no fundamental change in housework hours in the last 100 years, if household size and labour force status are held constant. This is the case in spite of all the household technological innovations and machines. He explains this phenomenon by the diminishing productivity in housework, which is due to smaller household sizes nowadays. In this article we ask, what kind of factors can explain the changes in housework in households of different sizes? Are they related to family structures or differences in types of tasks and their magnitudes of domestic work? We will next examine these background variables.

4 TIME USE FOR DIFFERENT DOMESTIC TASKS BY HOUSEHOLD TYPE

The biggest share of domestic work time goes into cooking and housecleaning, and in families with children into childcare. The time spent on the majority of domestic tasks more than doubles when household size grows from one to two members. Pensioners (singles and couples aged 65 or over) spend more time on nearly every domestic task than people of working age (singles and couples aged less than 65). Again, singles and couples aged under 45 spend on housekeeping (cooking, housecleaning and laundry) only half of the time compared to that of singles and couples aged 45–64. The difference was similar in all housekeeping tasks (Varjonen & Aalto 2005a). Working-age couples use on average almost as much time for housekeeping as couples with one child. Time use for housekeeping in families with children increases by one hour and 50 minutes per day when the size of the household grows from three to five (figure 2).

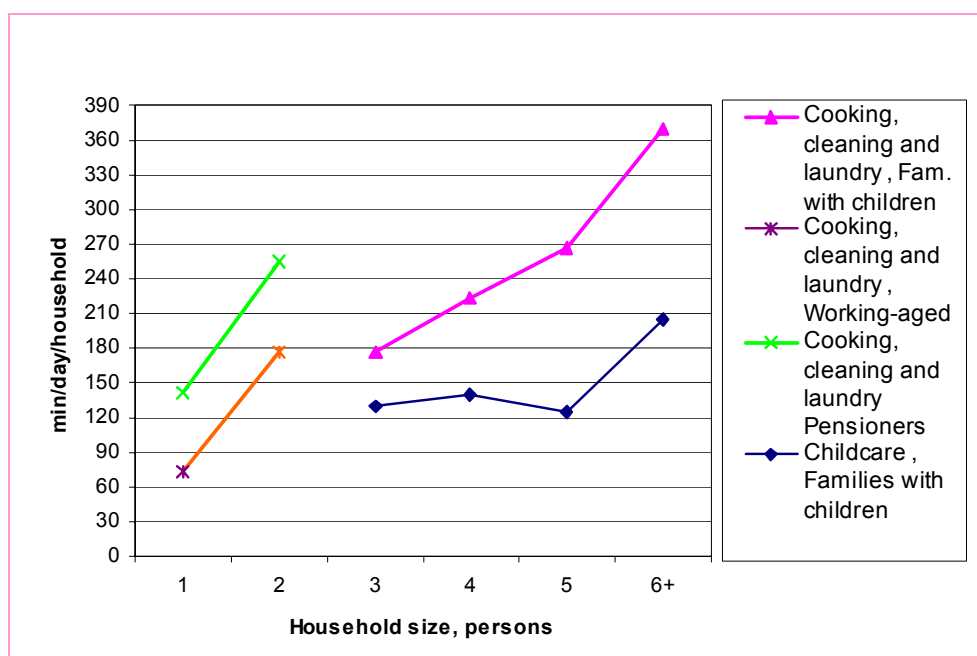


FIGURE 2. Time use for housekeeping and childcare in different types of households

Pensioner households spend daily more than an hour more time on food management and housecleaning than working-aged households. A pensioner household with two members uses almost as much time for these housekeeping tasks as a five-member family with children, and for cooking even more time than a five-member family with children. Why do pensioners use so much time to the cooking, cleaning and laundry? This may be explained by the salience of the meals in elderly people's lives. A study on the eating habits of Finnish pensioners revealed that most of the elderly (87%) had three meals a day, and two thirds of them had at least two warm meals a day. They prepared these

meals mostly by themselves unlike the people in labour force who eat more cafeteria meals. Only 13 % got help in meal preparation, most of them were more than 80 years old. (Kallio 2005, 60–62.)

Food management, housecleaning and laundry in families with children

Time spent on housecleaning increases by 40 minutes and cooking time by 30 minutes as the size of a family with children grows from three to five members (figure 3).

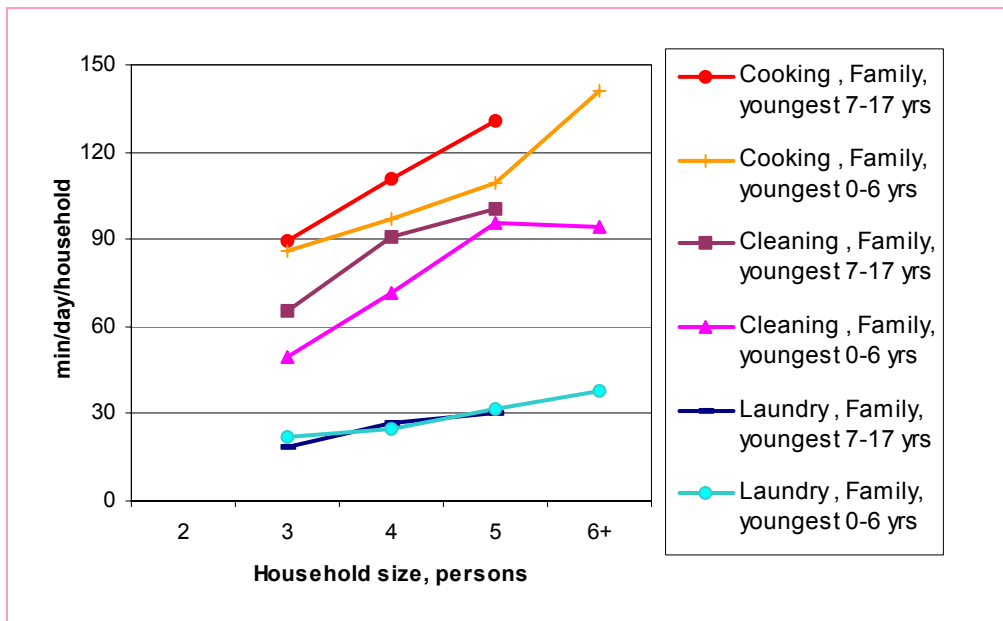


FIGURE 3. Time use for housekeeping tasks in different types of families with children

Note: The number of large (6+) households with school-age children is not sufficient to give reliable results. Correspondingly, the number of study days of households with small children is only 42.

Moreover, the age of the children has an effect on housework time. Families, in which the youngest child is above 7 years old, spend clearly more time on housecleaning and food management than families with smaller children. They also use slightly more time for cooking and baking than same-sized households with small children. By contrast, laundry time increases only a little along with household size. Here, the economies of scale might be gained by washing bigger loads in larger families (Aalto 2002, 69; Aalto 2003, 32). Same-sized families with children use about the same amount of time for laundering regardless of whether the youngest child is younger or older than 7 years. The washing frequency is similar in families regardless of the age of children (Aalto 2003).

Childcare

The category of childcare time we use here, includes only childcare as a primary activity. It may mean physical as well as non-physical care and travel related to childcare. Childcare appears to have greater economies of scale than other housework tasks. Two-parent households use, on average, about two hours per day to care for a single child. There is tremendous difference in time use caring for small children compared to caring for children of school age (figure 4).

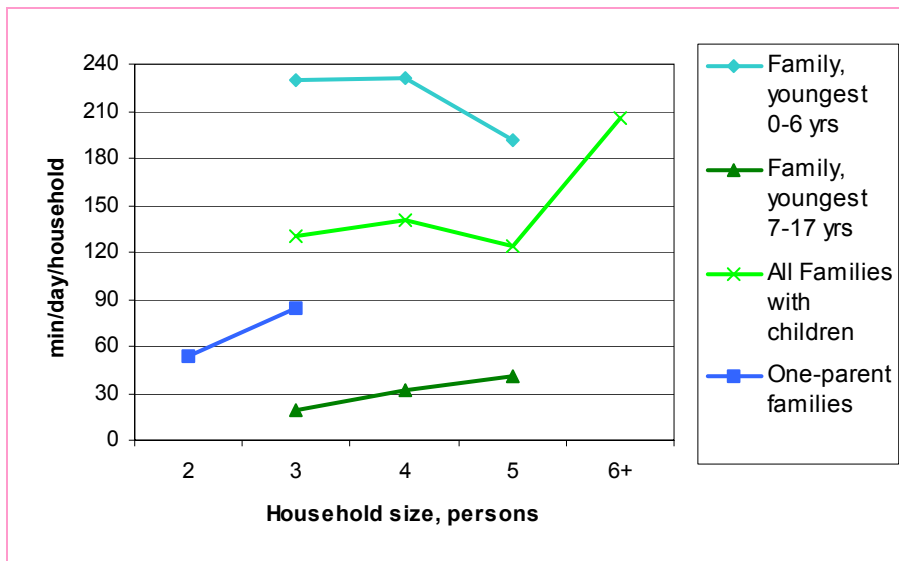


FIGURE 4. Time use for childcare in different types of families with children

The age of the youngest child seems to be a significant factor in the economies of scale, though in an unexpected way. With children of school age, the time use increases along with number of children. On the contrary, in families with the youngest child aged 0–6 years, the total childcare time does not increase even when the number of children grows from one to three. Instead, it actually decreases. Particularly, the time used for reading aloud, playing with the children and taking them out decreases with larger household size. This is probably because two or more children will play together, enabling the parents to watch over them at the same time. By contrast, transporting children takes slightly more time in larger households. Childcare time in five-member families is reduced partly because they make use of childcare services provided by other households more often than other families. We must also remember that in larger families there is more other housework to be done, and not so much time for playing with children. Unfortunately, the data did not allow us to examine the larger households with children by age of children, as the childcare time increases sharply in larger families.

Moreover, it has to be noted that childcare time in families with children aged 0–6 years is more than tenfold compared with same-sized families in which the youngest member is aged 7–17. Caring for a single child over 7 years takes up only 20 minutes per day. With more children, time use increases so that caring for three children aged 7–17 takes up more than 40 minutes per day. What increases in particular is the time used for

supervising the children’s hobbies – listening to them sing or play an instrument, or watching their sports training, for example.

The increase in the time used for childcare in large (6+) families is partly explained by the fact that the mothers of large families are less often employed full-time than the mothers of smaller families, which probably increase time use for childcare and other domestic tasks in the largest households. Over 30% of the mothers of families with more than five members are full-time mothers, whereas their corresponding share in smaller families is less than 17%. Almost all the other mothers are employed full-time. Furthermore, the larger families are more likely to have young (0–6 years) children than other families.

The economies of scale in time use for childcare seem to be remained about the same during the past 20 years when comparing the number of children (Säntti et al. 1982). The time use increases from one to two children, but for three it's slightly less than for two children.

Shopping and errands

The time spent on shopping and errands increases almost to threefold as we move from a single to a two-member household. Couples are most likely to do their shopping together – at least the major purchases. In addition, both of them do their own shopping, which increases their total shopping time (figure 5).

Single-child families spend only a little more time on shopping and errands than couples do. Families with small children use about the same amount of time for grocery shopping as same-sized families with school-age children. However, shopping for utility products such as clothes takes clearly more time in families with school-age children than in families with younger children.

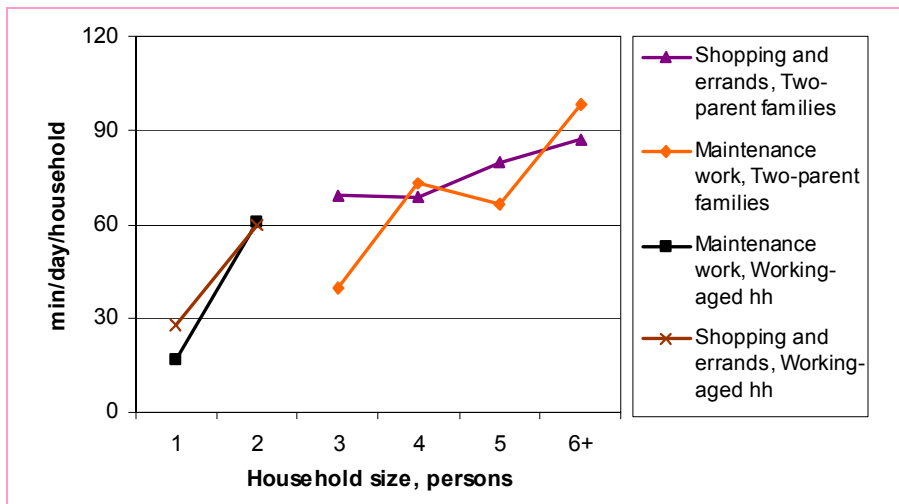


FIGURE 5. Time use for shopping and errands and household maintenance in different types of households

When comparing families of equal size, the time use for shopping and errands has more than doubled during the past 20 years (Säntti et al. 1982, Varjonen & Aalto 2005a). That is clearly the greatest change compared to any other household task.

Household maintenance

The time used for household maintenance does not depend on the size of the household but on other factors – such as whether the household lives in an apartment building or in a single-family house, and whether it owns a summer cottage. Families with small children spend very little time on maintenance while same-sized families with older children use 20–40 minutes more than families with young children on maintenance tasks, especially due to more time spent on yard care and pet care. Pensioner couples use nearly 20 minutes more time for household maintenance tasks than working-aged couples. Pensioners spend more time particularly on gardening and yard care, because, compared to younger singles and couples, they live more often in houses of their own instead of living in a block of flats.

Changes in the structure of domestic work

Even though the domestic work time has remained the same in families of equal size from 1979 to 2000, its composition has changed, especially in families with children. Food management took 27% of the total domestic work time in 1979 compared to 19% in 2000. Time use on shopping and errands has increased most. In 2000 it amounted to a share equal to that of food management, while in 1979 the share of shopping and errands was only 8%. In the same way, the share of housecleaning has increased and the share of laundry and handicraft has decreased. Less time is used on childcare in families with one child, but in bigger families the childcare time has remained much the same as in 1979.

5 PROPORTIONAL CHANGE IN DOMESTIC WORK TIME WITH INCREASING HOUSEHOLD SIZE

We now turn to look at relative changes in time use when household size grows by one member. We use indexes to make these changes comparable (table 2). Time use by a single household is set at 100, and in families with children the index is 100 in single-child families. Time use per person in other household types is proportioned to this figure to obtain commensurate time-use percentages in different-sized households.

TABLE 2. Total domestic work time (index) per person by household size

Household size	All households	Two-parent families with children, single-child family = 100			Single-parent households
	Single household = 100 (171 min)	All two-parent families; 100 = 160 min	Youngest 0–6 yrs; 100 = 175 min	Youngest 7–17 yrs; 100 = 145 min	Single-child family 100 = 147 min
1	100				
2	113				100
3	94	100	100	100	87
4	84	90	87	92	
5	72	77	71	84	
6.7	74	80			

The column describing time use in all households shows, for instance, that a five-member household spends, per person, 72% of the time spent by a single household on domestic work. Similarly, among families with the youngest child aged 7–17, time use per person in a five-member household is 84% of the corresponding time use in a three-member family.

Scale benefits are most significant between two and three person households, when examining all households irrespective of the family type. Moving from a single household to a two-member household increases domestic work time per person by 13 percentage units, but moving from a two-member to a three-member household reduces time use per person by as much as 32 percentage units.

If we examine families with children, we see that domestic work time per person is lowest in families of five members. It must be remembered that total time used to domestic work increases, of course, along with every additional member. Changes in time use do not tell much about the well-being of the family members as such, much depends on how the total time is divided between the household members. Yet, if we take a hypothetical situation in which all domestic work is equally divided between all members

of the household, then the members of a five-person household would get by with less than those of households of any other size.

Scale economies seem to be greater in families with small children than in families with school-age children. This is due to the decreases of childcare time when babies and toddlers grow older and need less care as a primary activity, as it will be shown later in this article. There are no corresponding changes in the case of school-age children. When they get older, the content of care tasks changes but only slightly less time is needed for the tasks. Domestic work time per person appears to grow in households larger than five members. Unfortunately, the size of the data does not allow us to examine larger families more in detail. In the following, housekeeping tasks and childcare are examined more closely.

Cooking, housecleaning and laundering

Cooking, housecleaning and laundering are frequently occurring tasks in every household. Routines are often developed for performing these tasks. Therefore it could be supposed that scale benefits will most clearly appear in these tasks. This also proved to be true. Time per person used for these tasks decreases evenly up till the largest families. The only exception are the two-member households, but even in these no more time are used than in single households. Scale economies reduce in proportion when moving to larger households (table 3).

TABLE 3. Time use for housekeeping tasks per person (index) by household size

Household size	All households	Two-parent households		
	Single household hh =100 (95 min)	All, 100 = 59 min	Youngest child 0–6 yrs, 100 = 56 min	Youngest child 7–17 yrs, 100 = 62 min
1	100			
2	100			
3	70	100	100	100
4	60	95	91	99
5	57	91	92	90
6,7	56	94		

Childcare

Families with small children gain remarkable scale economy benefits in childcare time, as is shown in table 4. In practice it means that caring for two children takes about as much time as caring for one child, if we only look at primary childcare (including travel related to childcare). A third child brings further economies of scale, to the extent that total childcare time per household is actually smaller than in a family with two children. It is possible that children under 10 years of age sometimes take care of their younger siblings, which might explain the reduction in time use. Unfortunately we did not have information on the time use of children under 10 years of age, so it remains unclear how much which would explain.

TABLE 4. Time use for childcare per child (index) in two-parent households

Number of children	Two-parent households, single-child family = 100		
	All, 100 = 130 min	Youngest 0–6 yrs; 100 = 229 min	Youngest 7–17 yrs; 100 = 20 min
1	100	100	100
2	57	51	92
3	35	28	84
4+	40		

6 MOTHER'S, FATHER'S AND CHILDREN'S SHARE OF DOMESTIC WORK TIME

As pointed out earlier, domestic tasks are not necessarily distributed equally between the household members. We will now see how this division of time use changes with increasing household size.

Both the mother's and the father's share of domestic work time diminishes as the size of the family grows, because the children also take part in household tasks. For instance, the mother's share decreases from 63% (5h 5min a day) in a three-member household to 54% (7h 35min a day) in a household with six or more members. The father's share of domestic work time drops from 33% down to 23% (2h 40min > 3h 13min a day) as household size grows from three to over five persons. In the largest families the father's share is equal to children's combined share (figure 6).

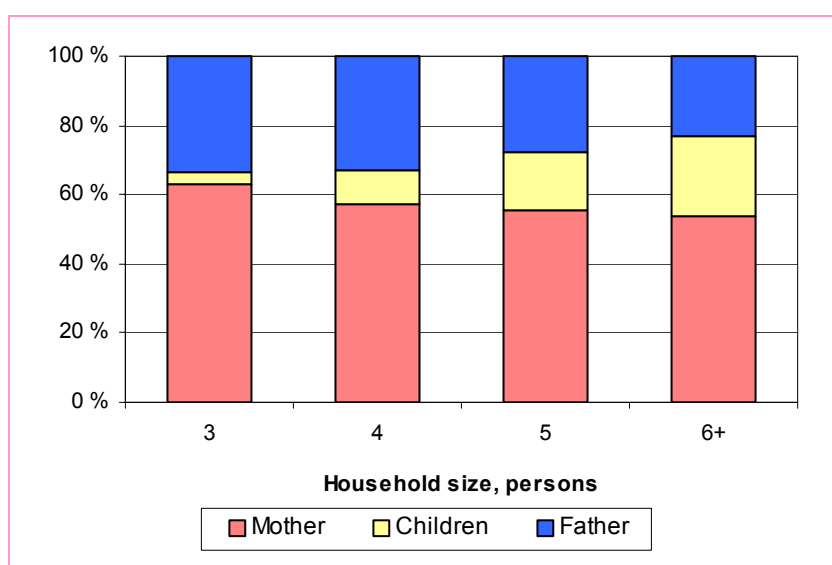


FIGURE 6. Distribution of domestic work time, %

The division of housework is nowadays more equal than in the past. Mother's share of housework was in average 70%, father's 25% and children's share was 5% in 1979. There were no results about distribution of domestic work time between family members along with growing family size. Similarly as in our study, the housework time of women increased as the household size grew. Conversely, father's housework time increased only until five-member family and decreased in larger families. (Säntti & Väliäho 1982, 62.)

Among individual domestic tasks, time use is most evenly divided between mothers and fathers in shopping and errands and maintenance tasks. If we look at the housekeeping time the situation is different. The mother's share of housekeeping time reduces less than her share of total domestic work time (74% to 66%). The greatest difference between mothers and fathers is found in laundry and other clothing care, which are almost totally taken care of by the mother. She also does most of the tasks of cooking, childcare and

housecleaning. The children's share increases for all domestic work as the size of the household grows.

In clothing care, the mother's share is more than 80% even when household size increases. The father's share is 10% at its highest and diminishes with larger household size. The mother accounts for 70% of total child care time and the father for less than a third. As family size grows, both parents' shares fall slightly. The children's combined share of clothing care time exceeds the father's when the household has more than four members.

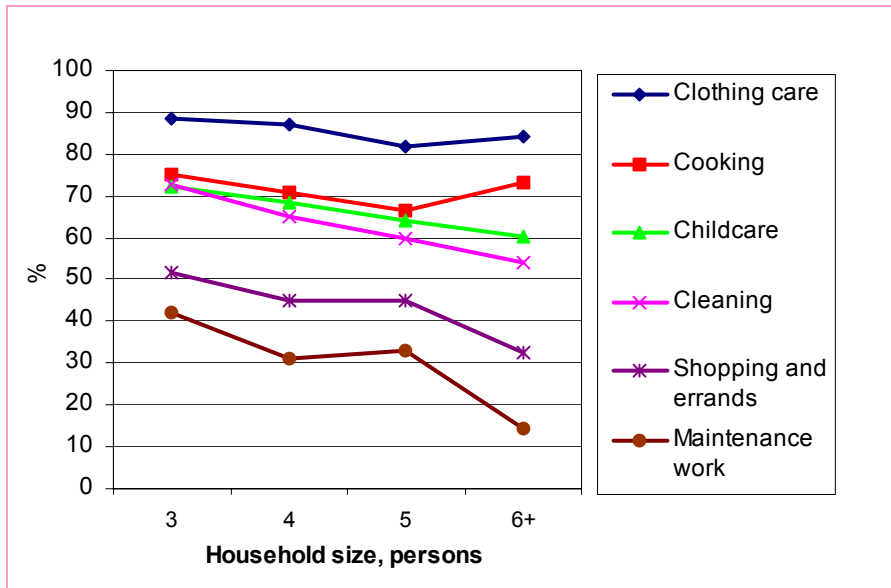


FIGURE 7. The mother's share of domestic work time

The mother accounts for more than 70% of housecleaning and cooking time in three-member households. With increasing household size the mother's share of cleaning time falls below 55%, while her share of cooking and other food management time remains more or less unchanged (figure 7). The father's share of cooking and cleaning is less than 25% and declines as household size increases. The mother's share of cooking time is at its lowest (65%) in a family with three children, but a rises gain in bigger households. This rise is probably partly due to the fact that one in every three mothers of the largest households is a full-time mother, which means that food is prepared at home more frequently than in smaller households, where a clearly higher proportion of mothers are employed outside the home.

Household maintenance is the only domestic task in which the father's share (more than 50%) is larger than the mother's in all family sizes (figure 8). The mother's share is at its highest (more than 40%) in three-member households; in the largest families her share is down to even less than 15%.

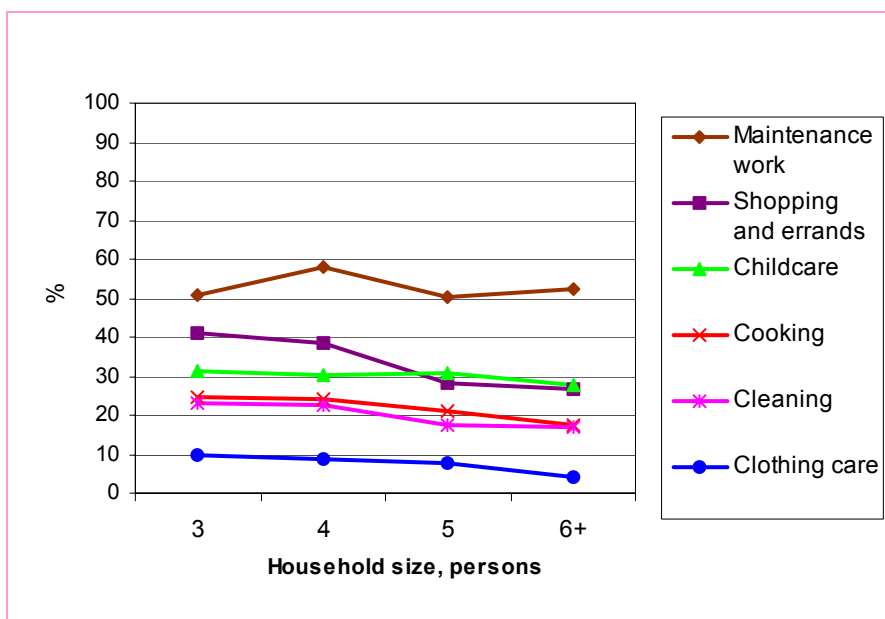


FIGURE 8. The father's share of domestic work time

Both the mother's and the father's share of total time use for shopping and errands decreases with growing household size. In three-member households, the mother accounts for about 50% and the father for about 40% of the total, while in the largest families the mother's share is reduced to 33% and the father's to 27%. Especially the mother's time use for shopping and errands is shorter in comparison with smaller households.

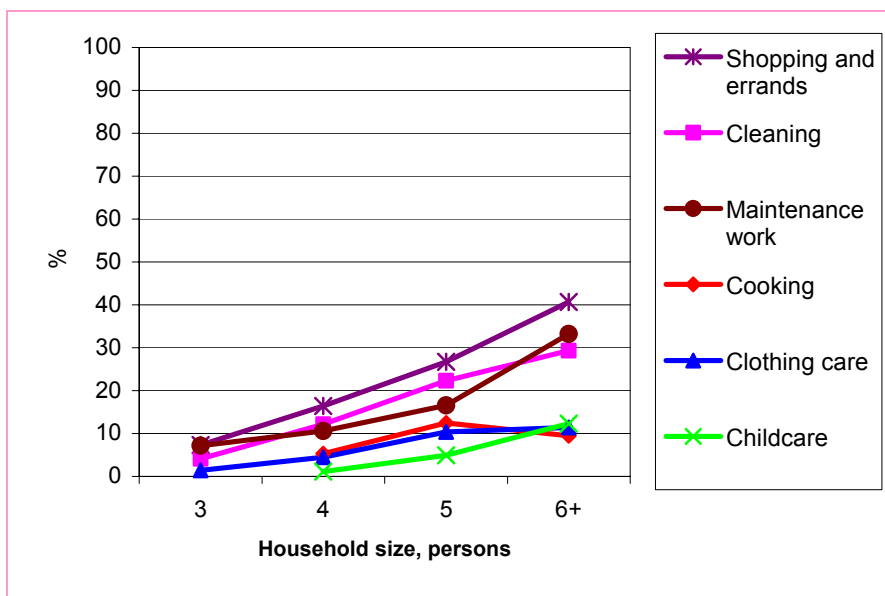


FIGURE 9. The children's share of domestic work time

The children's share of domestic work time is largest in shopping and errands. In the largest households their combined time use for shopping and errands and maintenance is greater than the mother's time use to these activities. Results from the situation 20 years ago indicate that girls took mostly part in cooking and cleaning, and boys in maintenance tasks. However, children's time use in shopping was quite modest (Säntti & Väliaho 1982, 18).

7 CONCLUSIONS AND REFLECTIONS

The study data indicate that there are economies of scale to be gained in domestic work time. The benefits are greatest for households with five members, although they vary in size between different household types and also between different tasks. Despite scale economies, total domestic work time always increases along with larger household size, with the sole exception of primary childcare time in families with small children where the time decreases. The total domestic work time has remained surprisingly constant during the past 20 years in households of equal size, despite the fact that the composition of domestic tasks has changed distinctly.

Our finding that the economics of scale does not exist at all when comparing single-households to couples was somewhat surprising. Housekeeping time of the couples more than doubles compared to the persons living alone. This is the case in all housekeeping tasks: cooking, laundering and especially in housecleaning. Among working-aged people the difference is even bigger than among the elderly singles and couples, which may indicate that especially the single working-aged spend less time at home and do less housework than people of same age living in couples.

Because a person only has 24 hours to spend in a day, the economies of scale are not necessarily attributable the benefits of scale but also imply priorities in tasks when time is short. Childcare, for example, may be given priority at the expense of housekeeping tasks when possible. In families with small children, life tends to centre around childcare more than in other households, and proportionally less time is used for food management and housecleaning. On the other hand, time use for these latter tasks increases in families with school-age children. The latter also spend clearly more time on yard care and pet care than families with small children.

On average, scale economies in cooking, cleaning and laundering are more straightforward than in other domestic tasks. One reason may be that these tasks are repeated regularly almost on a daily basis and are therefore likely to be developed into routines, particularly as they are usually taken care of by the same person, often the mother.

Pensioners, both single households and couples in particular, use more time for all domestic tasks than other households. They have more time available and they are able to choose their time-use more freely. Domestic tasks also help to sustain their ability to function. As their functions slow down, they may prefer to go about their tasks in a leisurely manner, without having to hurry – now that they finally have the chance to do so.

In large households, the children's participation reduces both the mother's and the father's share of domestic work time, showing that despite claims to the contrary, children do take part in these tasks. The benefit is rather equally divided between mother and father. What is considered as the ideal division of labour or what objectives family value as to overall well-being is another issue that every family needs to decide for itself.

Finally, what can we say about the future trends of the domestic work time? We conclude that there are two opposite trends. On the one hand, domestic work time may increase in the future at the national level. This conclusion is supported by the results of this study, which show that domestic work time per person is greatest in small households, particularly in two-person households. And, the ongoing trend towards smaller household sizes diminishes the benefits of scale in domestic work. On the other

hand, the housework time has decreased in single households during the past 20 years, while especially in families with children it has remained surprisingly the same. This may be explained by the increased outsourcing of domestic work, especially for food preparation (buying convenience food as well as eating out more often), which is more profitable for the single households than for larger households, due to the economies of scale. Thus, in the future, much depends on the development of household size. If the number of single households continues increasing, fewer babies are born, and outsourcing domestic work continues, the domestic work time will decrease. If the number of couples increases, then the housework time will increase.

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