# New Estimates of Time Use in Sweden 1950-2012*

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ABSTRACT

The official statistics on GDP and the labour market exclude unpaid domestic services. Yet there are good theoretical reasons why historians should study unpaid work. This paper reconstructs annual estimates of time use in Sweden from 1950 to 2012 among women and men. It finds substantial convergence between the genders in time use from the 1960s to the early 1980s. During the period of inquiry, the gender difference in total working time vanished. The double burden for women did not increase when they entered the labour market. The reduction in the time women spent on unpaid work is explained about equally by the shortening of the total amount of unpaid work and by increasing male participation in household chores. In 1950-1963, the reduction was explained mainly by the decline in the making and mending of clothes at home and the spread of domestic appliances. In the 1963–1984 period, instead, it was due chiefly to men's greater participation in household work. These mechanisms were largely historically contingent, suggesting that it is impossible to single out just one factor to explain why Sweden today has less gender inequality than other countries.

## 1. Introduction

Our knowledge of the historically gendered division of labour still has many gaps. Ramey argues that there "is no consensus□

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on trends in home production time during the twentieth century."[1] Ruth Cowan shows that despite the increased use of household appliances, more time was devoted to housework a century after 1870.[2] Although women now work more for pay in the market, they face the double burden of retaining the primary responsibility for domestic work. Mokyr terms this the "Cowan paradox."[3] Before Cowan, Vanek similarly argued that women not working outside the home nevertheless had not reduced their household work compared to their mothers and grandmothers.[4] Other authors contend that the diffusion of appliances has greatly reduced the amount of time spent on home production, allowing women to increase their participation in salaried employment.[5] Time use surveys should be able settle such controversies, but there is the problem of attaining temporal comparability, given the differences in methodology and coverage.[6] In the United States, there are no nationally representative time use surveys before 1965.[7]

National accounts statistics reconstruct long macroeconomic series of production, income and work. Unpaid domestic services are usually not included in these series. Historical research on the Swedish national accounts has made some pioneering efforts to estimate unpaid work, but until now no study has presented a continuous series on hours worked in paid and unpaid work for the entire Swedish working age population.[8]

This study presents consistent series of different types of housework over time that could serve to reconstruct historical national accounts for Sweden including unpaid domestic production. This

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[1] Ramey, "Time Spent", 2
[2] Cowan, *More work*, 178.
[3] Mokyr, "Why More Work for Mother?'", 2.
[4] Vanek, "Time Spent".
[5] Greenwood, Seshadri and Yorukoglu, "Engines"; Sayer, "Gender", 291.
[6] Gershuny, *Changing Times*, 106-7.
[7] Ramey, "Time Spent", 3; Fisher, Egerton, Gershuny and Robinson, "Gender Convergence", 5.
[8] Lindahl, Dahlgren and Kock, *National Income*; Krantz, *Husligt arbete*; Edvinsson, "Ekonomisk tillväxt".

contribution is important for analysing long-term economic growth from a gender perspective. The paper exemplifies the potential uses of the new data by investigating the mechanisms behind the convergence between the work of women and men. The Swedish case is of particular interest since gender inequalities are smaller than in most other countries. No formal tests of structural breaks are performed, given that the annual data is not sufficiently reliable.

For Sweden, a number of time use surveys have been conducted since the 1930s, but their coverage, methodologies and categories are not consistent. Previous historical studies that have compared the various time use surveys have failed to adjust for differences in methodology and discrepancies with the national accounts.[9] Only the two most recent surveys, dating to 2000/01 and 2010/11,[10] are satisfactory in covering the whole working age population during the entire year. International research shows that various adjustments to time use surveys are necessary.[11] However, the compilation of a comprehensive data set necessarily involves, as Gershuny puts it, "many heroic assumptions" that "are piled on top of each other."[12]

The present study accordingly focuses on a series of research questions: To what extent can we reconstruct a reliable series of time use in Sweden since 1950 given the weaknesses of the various primary sources and changes in methodologies? To what extent is the data from time use surveys compatible with that of national accounts on paid work, and how can any discrepancies be adjusted? How has the gendered division of labour evolved since 1950, considering unpaid as well as paid work? Has unpaid domestic work increased or decreased over the decades?

The next section discusses where to draw the distinction between work and leisure and how to analyse changes in the compo-

[9] Nyberg, Tekniken; Svensson, "Technology".
[10] Statistics Sweden, *Tid för vardagsliv*; Statistics Sweden, *Nu för tiden*.
[11] Bianchi et al., "Is Anyone Doing the Housework?"; Gershuny, *Changing Times*; Gershuny, "Cross-national changes", 334-5; Ramey, "Time Spent".
[12] Gershuny, *Changing Times*, 109.

sition of time use. It is demonstrated that the various Swedish time use surveys cannot be simply taken in straightforward fashion, and that there is a need to make adjustments in order to achieve comparability with the national accounts. This demonstration is followed by a discussion on how the elasticity of unpaid with respect to paid work can serve as a tool to adjust the data and interpolate between benchmark years. The following section analyses the mechanisms behind the reduction in unpaid work over time, which have differed from one period to the next. The conclusion assesses the main results, arguing that the Swedish case shows that substantial convergence in the time use of women and men is possible.

## 2. Unpaid and paid work

The *System of National Accounts 2008* (2008 SNA) recognizes that unpaid household services are "productive in an economic sense" but observes that the inclusion of "large non-monetary flows of this kind" in the national accounts would "reduce the analytic usefulness of the data."[13] Instead, the recommendation is to construct satellite national accounts that do include unpaid domestic work.

Studies that include unpaid housework in production normally start with the "third-person criterion."[14] If a task can be delegated to someone other than the person who gets the benefit of the activity, that task is defined as productive. Productive activities are distinguished from personal activities.

The latest Swedish time use surveys make a further division into five types of activities: paid work, unpaid work, study, personal needs and free time. Analytically, the application of such a division is not clear-cut.[15] For example, making clothes for own consumption could be viewed as paid work since it generates a potential income

[13] United Nations et al., *System*, 6.
[14] Eurostat, *Household production*, 19; Reid, *Economics*, 6-11.
[15] See also Gershuny, *Time-Use Surveys*, 15.

(if the clothes were to be subsequently sold in the market), unpaid work since there is no monetary transfer involved in the production, or as free time if it is considered as a hobby (that is, if the sole purpose of the activities is to give pleasure to the person performing them, that pleasure would disappear if the activity was delegated to another person). While recent time use surveys classify making clothes for own use as a hobby, the present study classifies it as unpaid domestic work, for consistency over time and with the SNA production boundary, which defines all goods production as productive.[16] The later surveys register primary and secondary activities more systematically. For comparability over time, however, the present study considers only primary activities.

The estimates of paid work are not always more reliable than the estimates of unpaid work. The problem of distinguishing work from leisure also pertains to paid work. Hours paid does not correspond exactly to hours actually worked. Ideally, paid work should correspond to the production boundary of SNA 2008, which excludes unpaid domestic services. One problem is that not all the activities encompassed within that boundary are paid (such as building your own house or making your own clothes), and they are not included in the official statistics on employment and hours worked.

In various models of the household economy, unpaid household work counts as a productive activity in the same way as paid work.[17] Models also show that in theory there is not necessarily any "Cowan paradox", to use Mokyr's phrase. Technical innovations, such as cheaper appliances, can be accompanied by an increase, a decrease, or no change in the amount of time spent on household work.

In a model developed by Becker on the household economy, a low wage rate for women means that the marginal product of women's time when it is all spent in the household is greater than the wage rate during parts of the life cycle.[18] Multitasking, such as

[16] United Nations et al., *System*, 6.
[17] Becker, *A Treatise*; de Vries, *The Industrious Revolution*; Ramey, "Time Spent".
[18] Becker, *A Treatise*, 26.

regular household work combined with childcare, can be of particularly high value.[19] Such a situation tends to lock women into the role of housewives. This can change when substantial shifts occur in the wages of women relative to the marginal productivity of household work. Theories of cooperative conflict, which criticize unitary household models like Becker's, also emphasize women's bargaining position both within and outside the household.[20]

Various, partially countervailing factors affect the time spent on unpaid labour. Nyberg distinguishes between the technology, merchandise and consumption effects. Her arguments are very similar to the formal models of the household economy.[21]

The technology effect reduces total time given a constant level of household services. Svensson shows that the average potential time savings in Swedish urban households thanks to the introduction of new technologies was more or less linear from 1920 to 1970 (a yearly reduction of 10-15 minutes per week), followed by an acceleration in the 1970s (17 minutes per week) and a deceleration in the 1980s (7 minutes per week).[22]

Another important factor is the merchandise effect. The dominant tendency over the last few centuries has been the relative expansion of market activities. Restaurant services have supplanted home preparation of meals, while public childcare has lessened the burden of women with small children. For some parts of the economy there could be a reverse merchandise effect. For example, in Sweden during the 1940s and 1950s paid domestic services were largely replaced by unpaid (and also to some extent by other paid services).[23]

The increase in private consumption also tends to increase the volume of household services, what Nyberg calls the "consumption effect". In line with Cowan, Nyberg argues that during the period

[19] See also Kalenkoski and Foster (eds.), *The Economics of Multitasking*.
[20] Agarwal, "Bargaining".
[21] Nyberg, *Tekniken*, 35-49.
[22] Svensson, "Technology", 11.
[23] Nordlund Edvinsson and Söderberg, "Servants and bourgeois life", 435.

she studies, for married women the technology and merchandise effects were roughly counterbalanced by the consumption effect, even if the exact outcome was different for different activities.[24]

Reconstructing historical statistics requires various theoretical assumptions, without which the different time use surveys cannot be compared or adjusted to the national accounts statistics on hours worked, and no consistent time series can be constructed. What is important is that these assumptions be transparent, so that other researchers can judge their credibility. One crucial assumption concerns the response of households to increased participation in the labour force. The present study uses estimates of the elasticity of unpaid work with respect to paid work to adjust the data.

## 3. The data

This study uses two types of primary sources: national accounts on paid work and time use surveys on both paid and unpaid work. Hours worked according to the time use surveys usually differ from the official labour statistics and the national accounts.[25] For the sake of comparability we adjust the time use surveys to the national accounts.

We use the official sources to estimate total hours of paid work, adjusting the time use data accordingly. Information on average hours worked in Sweden is very difficult to obtain before 1950,[26] so we focus on the subsequent period, even though many important changes in household work took place earlier.[27] Although censuses and poll taxes before 1950 provide some data on women's labour market participation,[28] these are substantial underestimations, especially for married women.[29]

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[24] Nyberg, *Tekniken*, 262-7.
[25] Hirway and Jose, "Understanding Women's Work", 68.
[26] Jungenfelt, *Lönernas andel*, 5.
[27] Svensson, "Technology".
[28] Svensson, "Technology", 16.
[29] Nyberg, *Tekniken*; Nilsson, *Taking work home*, 103.

For the period since 1950, Statistics Sweden provides data on hours worked. For 1950-1994, there are five different time series: for 1950-1960, 1960-1963, 1963-1970, 1970-1980 and 1980-1994 (for sources, see Figure 1). Linking those series does not raise serious problems, as the classification into economic activities and the definition of employment do not vary. There are, nonetheless, several breaks, which we first eliminate by taking the 1980-1994 series as a benchmark.

In the 1990s, Statistics Sweden switched to the 1993 SNA (and later to the 2008 SNA), but it presents the data at a detailed level according to the new methodology only from 1993 onwards. The break in the time series in 1993 is therefore very significant compared to earlier breaks, not least because of changes in the classification into economic activities and the inclusion of more people within the concept of employment. For 1993, the new series put total hours worked at 6,551 million, against 6,010 million for the old series.

The national accounts on hours worked are the most comprehensive, but they do not distinguish between women and men or between various age groups. To distribute the hours worked between women and men, the present study uses other sources, even if the sum of hours worked is somewhat lower than the national accounts estimate. To estimate hours worked for people aged 20-64, we take the census data on the number of persons employed in different age groups, based on Statistics Sweden.[30] Official data on hours worked broken down by gender are available only since 1966. Earlier, work insurance statistics can serve as an indicator for backward extrapolation.

Time use studies are crucial for the construction of satellite national accounts that include unpaid domestic services.[31] The surveys used in this study are summarized in Table 1. We employ some simple formal statistical techniques to adjust earlier surveys that are not nationally representative. As in previous research, such as Ramey's

[30] Statistics Sweden, *Statistisk årsbok*.
[31] Varjonen, Hamunen and Soinne, "Satellite Accounts", 9.

reconstruction of time use in the US back to 1900, some strong assumptions are required, in particular as regards groups that have not been surveyed.[32] What is important is to calculate how various population groups differ and then derive the national average from the estimations for the single groups. The same type of adjustment is necessary to derive representative data for an entire year from questions bearing on time use during weekdays only. By calculating the elasticity of unpaid with respect to paid work, the present study interpolates the annual data on time use between survey years.

**Table 1**
**Summary of the time use surveys used for this study**

| Period covered | Summers | Weekends | 24 hours | Ages | Other problems |
|---|---|---|---|---|---|
| 1951 | No | Yes | Yes | Working age | Only Stockholm families with full-time housewives are covered. |
| 1951 | No | Yes | Yes | Working age | Only married women and daughters of agrarian households are covered. |
| 1964 | No | No | Yes | Working age | Median time use rather than mean. Only married couples are covered. |
| 1974 | Indirectly | Indirectly | No | 16-74 | Respondents only reported what proportion of five household tasks they performed. Age groups 16-19 and 20-24 are presented together. |
| 1981 | No | Yes | Yes | 16-74 | |
| 1982-3 | No | Yes | Yes | 16-74 | |
| 1984-5 | No | Yes | Yes | 20-64 | |
| 1990-1 | No | Yes | Yes | 20-64 | |
| 2000-1 | Yes | Yes | Yes | 20-84 | |
| 2010-1 | Yes | Yes | Yes | 15-84 | |

Sources: See Table A1.

[32] Ramey, "Time Spent".

Only the time use surveys of 1990/1991, 2000/2001 and 2010/2011 apply comparable methodology and are representative for the whole population. All three surveys use stratified random sampling, weighting different strata in accordance with their weight in the total population.[33] For earlier periods, we calculate benchmark estimates for 1951, 1964, 1974, 1982 and 1985 based on different, less comprehensive surveys. The earlier surveys focused mainly on families with children, so some activities are missing. As a consequence some data have to be interpolated, such as those on unmarried women and men in the 1950s and 1960s, which is done mostly based on the time use surveys for other periods. Since there are no estimates of paid hours worked in the aggregate economy before 1950, the early time use surveys serve only to cross-check the later series. For all the benchmark years except 1974, time use surveys provide data for 24 hours of the day.

One limitation of the various pre-2000 surveys is that they do not include summer. The 1990/91 survey was carried out from September to May, that for 1964 in March and April.[34] Since women tend to work more overall on weekends (men on weekdays), we can assume that this also applies to the summer holidays. Women's work is not spread only over the day and the week, but also throughout the year. A weighted annual average ignoring vacations and holidays might well underestimate women's (paid and unpaid) work.

For all our benchmark years except 1974 time use is estimated for weekdays and weekends (for 1951 and 1964 also for Saturdays and Sundays, since in those two years Saturday was a working day, although shorter than the other work days). Since our aim is to gauge time use for an average day during the whole year, we assume that time use on vacation weekdays was the same as on weekend days in other periods of the year; an analogous assumption applies to holidays occurring on weekdays. In any case, the difference produced by this adjustment is quite small. The statutory vacation was three

[33] Statistics Sweden, *Tid för vardagsliv*, 118; Statistics Sweden, *Nu för tiden*, 121.
[34] For an analysis of the survey for 1964, see Edvinsson, "Ekonomisk tillväxt".

weeks starting in 1951, four weeks starting in 1963 and five weeks starting in 1978.[35] To simplify the calculations, we assume an additional nine days of holidays on weekdays during the year.

Only the time use of the working age population, 20-64, is considered, even though people under 20 and over 64 have done a lot of paid work and housework.[36] This limitation stems from the source material available: while some of the surveys present data for the elderly and the young, for most benchmark years this empirical material is too poor in quality.

The data for 2000/01 and 2010/11[37] are not adjusted except for the discrepancy with national accounts, and the earlier time use surveys are adjusted to these two surveys. The 1990/91 survey is only adjusted to take into account time use during vacations and holidays.[38]

The benchmark for 1985 is based on a time use survey from October 1984 to May 1985 (thus most of the survey days were in 1985).[39]

The benchmark for 1982 is estimated from two different studies, one for 1982/83, with 1900 respondents,[40] and one for 1981, with 600 respondents,[41] averaging them weighted by number of respondents. The two studies do not distinguish between weekdays and weekends. The 1990/91 survey is therefore first used to divide the time use of the various activities between weekdays and weekends and then adjusted to take into account the time use during holidays and vacations. Some activities are missing, such as sleep and eating. These are interpolated from the 1990/91 survey.

The surveys for the 1970s are worse in quality than those for the other decades. A survey was done in 1976,[42] but it covered only

[35] Eriksson, *Arbetstiden*, 10.
[36] For a study on this for the US, see Ramey, "Time Spent".
[37] Statistics Sweden, *Tid för vardagsliv*; Statistics Sweden, *Nu för tiden*.
[38] Statistics Sweden, *Tidsanvändningsundersökningen 1990/91*.
[39] Statistics Sweden, *Så använder vi tiden*.
[40] Konsumentverket, *Tids nog*.
[41] Konsumentverket, *Svenska folkets tidsanvändning*.
[42] Konsumentverket, *Tid och arbete*.

households with children and recorded time use only from 5:00 a.m. to midnight. A more serious problem is that if a person performed two tasks simultaneously the time was recorded twice (instead of being divided between the two tasks), so that the sum of the various time spans over the 19 hours covered is greater than 19 hours. For the 1970s, instead, we take as benchmark a 1974 survey in which the respondents reported the proportion of the various household tasks that they performed.[43] Only five tasks were included, and one-person households were excluded. No information is given on the amount of time devoted to the various tasks. Missing data are interpolated from the benchmarks of 1964 and 1982. The 1982/83 survey is used to determine the time use of single women and men.

The main purpose of the 1964 survey was to investigate the distribution of time between various household activities and to gauge the impact of additional children.[44] Different family types were investigated, including households without children, but not women or men living alone. Owing to lack of resources, only weekdays were surveyed, not weekends. The survey divided the day into quarter-hours, categorized according to the primary activity performed. An activity that took only five minutes, say, was therefore not included.

Another shortcoming of the 1964 survey is that the results are presented as median values, and the medians add up to 16 hours a day. In contrast, had the results been presented as arithmetic means the sum would automatically have been 24 hours. The reason for this discrepancy is a skewed distribution of the time used for various activities. Further, the data shows the shares of various groups performing particular activities and the medians for these users. From this data, time use during a day adds up to 22 to 23 hours for adult women and men of different family types. In the present study, we distribute the remaining time among the various activities. To calculate the allocation of time on Saturdays and Sundays among women and men, the ratios of the time use of various activities dur-

[43] Statistics Sweden, *Levnadsförhållanden*.
[44] Socialstyrelsen, *Hemarbete*.

ing the week from the 1951 benchmark are used to adjust the times for the weekdays in 1964.

A time use survey was also done for 1957, but we do not use it, since it failed to investigate time use during the whole of the day. It also excluded women without children, and men.[45]

The benchmark for 1951 is based on two different surveys, one on time use in families in two Stockholm suburbs[46] and one on time use of women in agriculture.[47] The survey of the Stockholm suburbs investigated both women and men, and presented data for all the days of the week. One limitation is that only families with full-time housewives were included. Investigations from the 1930s and 1950s show that the total workload of women increased along with the time spent in paid labour, even if those women partly rationalized away some of the household work. Adjustments are made in accordance with the estimates of the elasticities of unpaid with respect to paid work (see below). The total workload of women in agriculture was much greater than that of housewives in towns. The present study calculates the time use of women in 1951 as a weighted average of the two studies, with weights based on the proportion of the population engaged in agriculture. The time use of men is only based on the suburban study (adjusted for hours worked in paid employment according to the national accounts).

The appendix provides the data.

The estimates of the present study could be viewed statistically as expected values given the information we have at hand. But the confidence intervals are much more difficult to approximate.

There are three main sources of error: one pertains to the surveys themselves, the second to the adjustments made for the fact that the various surveys before 2000 were not representative, and the third to interpolation between the benchmark years. Only the first type of error is presented, in Tables 2 and 3, as relative standard errors of

[45] Boalt, *1000 husmödrar*.
[46] Holm, *Familj*.
[47] Grabö, *Arbetstiden*.

the various time uses for the benchmark years (except 1974). The other two types of error are very difficult to assess, but in any case they widen the confidence intervals.

The surveys for 1990/91, 2000/01 and 2010/11 provide information on the relative standard error, *RSE*, for various activities. The coefficient of variation can be written as $n^{½}RSE$, where $n$ is the sample size. For earlier studies, in year $b$, the coefficient of variation of an activity is assumed to be the median ($M$) of the coefficients of variation in the latest three surveys. Therefore:

$$RSE_b = \frac{M(\sqrt{n_{1990/91}}RSE_{1990/91}, \sqrt{n_{2000/01}}RSE_{2000/01}, \sqrt{n_{2010/11}}RSE_{2010/11})}{\sqrt{n_b}} \quad (1)$$

Tables 2 and 3 show that the highest relative standard errors are for study, the lowest for personal needs. The standard errors are also higher for the earlier time use surveys, which had fewer participants.

Paid work is calculated separately, from labour statistics and the national accounts, but the latter do not provide any confidence intervals. The relative standard errors of paid work in Tables 2 and 3 pertain only to the time use survey data.

**TABLE 2**
Relative standard error of the average time devoted to activity among women according to time use surveys

| | 1951 | 1964 | 1982 | 1985 | 1990/1 | 2000/1 | 2010/1 |
|---|---|---|---|---|---|---|---|
| Paid work | 10.0 | 5.4 | 3.7 | 5.0 | 2.1 | 2.3 | 2.4 |
| Unpaid work | 6.0 | 3.3 | 2.2 | 3.0 | 1.1 | 1.2 | 1.8 |
| Personal needs | 1.9 | 1.0 | 0.7 | 1.0 | 0.3 | 0.4 | 0.5 |
| Study | 38.2 | 20.8 | 14.1 | 19.2 | 9.3 | 7.8 | 11.3 |
| Free time | 5.6 | 3.1 | 2.1 | 2.8 | 1.1 | 1.2 | 1.4 |
| Sample size | 170 | 571 | 1250 | 670 | 1803 | 4018 | 2825 |

Sources: See Table A1. Paid work includes travel to work and meals during working time.

**Table 3**
Relative standard error of the average time devoted to activity among men according to time use surveys

| | 1951 | 1964 | 1982 | 1985 | 1990/1 | 2000/1 | 2010/1 |
|---|---|---|---|---|---|---|---|
| Paid work | 9.4 | 4.6 | 3.1 | 4.2 | 1.4 | 2.0 | 2.6 |
| Unpaid work | 8.5 | 4.1 | 2.8 | 3.8 | 1.2 | 1.8 | 2.1 |
| Personal needs | 2.4 | 1.2 | 0.8 | 1.1 | 0.3 | 0.5 | 0.7 |
| Study | 54.2 | 26.3 | 17.8 | 24.3 | 10.9 | 11.3 | 15.7 |
| Free time | 5.9 | 2.9 | 1.9 | 2.6 | 1.0 | 1.2 | 1.6 |
| Sample size | 135 | 571 | 1250 | 670 | 1833 | 3081 | 2167 |

Sources: See Table A1. Paid work includes travel to work and meals during working time.

## 4. The elasticity and the derivative of unpaid work

A discrepancy arises between the calculations based on the time use surveys and the national accounts figures on paid hours, even after adjustments for vacations and holidays are made. The main difference between the surveys and the national accounts is that while the former directly asks respondents how much they work the latter are mostly based on tax records (adjusting for tax evasion). Generally, the national accounts tend to under-report paid work by comparison with the time use surveys: on average, 4 per cent or 1.3 standard errors less. The largest discrepancy is for women in 2010/11, where the actual time spent on paid work was 15 per cent or 16 standard errors below the survey estimate. This may seem somewhat surprising, since the latest two time use surveys are the most reliable. This suggests a selection bias towards individuals who work more – i.e. that individuals outside the paid workforce could be less prone to participate in time use surveys (for example, due to illness).

In most international studies, this discrepancy has not been considered. National accounts are assumed to provide the most unbiased estimates since they make various adjustments for under-reporting. Historical national accounts sometimes also make use of time use

surveys. To make the adjustments, one must estimate the derivative of unpaid work with respect to paid work (for this estimate, "paid work" here is defined to include travel to work and meals at work). The simplest way to approximate the derivative, *D*, is:

$$D = \frac{\Delta t_{\mathrm{UW}}}{\Delta t_{\mathrm{PW}}} \approx \frac{t_{\mathrm{UW,A}} - t_{\mathrm{UW,B}}}{t_{\mathrm{PW,A}} - t_{\mathrm{PW,B}}} \qquad (2)$$

A and B are two different states, for example two strata of the population, or the same group at different times of the year, $t_{UW}$ is the time spent on unpaid work, $t_{PW}$ is the time spent on paid work. For example, if the derivative is –0.4, this means that a reduction of 1 hour in paid work is accompanied by an increase of 0.4 hours in unpaid work. This implies that the time spent on leisure and personal needs increases by 0.6 hours. The estimated derivative is not necessarily a causal relation. For simplicity, the present study assumes that (other circumstances constant) the derivative is constant at the time of survey.

A related measure is the elasticity of unpaid work with respect to paid work,[48] which is the derivative of the logarithm of unpaid work with respect to that of paid work. One problem is that the elasticity cannot be constant, and for zero values it will be undefined (since the logarithm of zero is undefined). Assuming a constant derivative of unpaid with respect to paid work, and setting it to between 0 and –1, as we do here, means that a decrease in paid work by 1 hour causes unpaid work to increase by between 0 and 1 hour. The elasticity of unpaid work with respect to paid work is then variable.

One problem is that the elasticities could shift over time. The estimates of the elasticities also depend on the time frames used: for example, comparing the time use among full-time workers to unemployed or part-time workers, working-age population to retirees, time use during weekends to weekdays, or the summer to the rest of the year. In the present study, the derivative of unpaid work with

[48] Gershuny, *Changing Times*, 181.

respect to paid work is calculated mainly from the difference in time use between full-time workers and part-time workers or non-employed.

The present study finds that at least until around 1990 there was a large gender difference. When men did less paid labour, they did not devote more time to household work, while when women entered paid employment they had to rationalize their household work. In the 21st century the difference between women and men narrowed substantially, and the derivative for both sexes approached zero. This could reflect a stronger bargaining position for women, in accordance with models of cooperative conflict.[49] However, it is also compatible with Becker's model of decreasing marginal productivity of household work relative to wage labour.[50]

According to the time use survey for 1964, women without children did 3.4 more hours per day of paid work on weekdays (including work travel and meals at work), while they spent 2.7 hours less on unpaid work. Using equation (2) yields a derivative of –0.79. According to a 1937 survey, household work for women in part-time work was 9.25 hours per week less than for women that were full-time housewives.[51] We do not know the average working hours in part-time work. Furthermore, the data for 1937 exclude care of children. The time use survey for 1964 shows that having children was the main reason why women did not take paid employment, even though men also tended to reduce their participation in paid labour. Women with children spent 11 hours a week on childcare. Including childcare for 1937 probably yields a derivative close to the estimate for 1964, which indicates that the derivative was stable between these two years. The present study therefore assumes that the derivative of women's unpaid work with respect to paid work was –0.79 for the whole period up to 1964. Based on various time use surveys, the derivative is estimated to be –0.57 for 1974, –0.48 in

[49] Agarwal, "Bargaining".
[50] Becker, *A Treatise*, 26.
[51] Utredningenför hem- och familjefrågor, *Familjeliv*, 54.

1990/91, –0.16 in 2000/01 and –0.24 in 2010/11. These estimates are based on the difference between non-employed and employed women. For other years, the values are linearly interpolated.

Determining the derivative of unpaid work for men is more difficult. Although the data for 1964 distinguishes between men with and without children, the difference in paid labour is quite small compared to that for women. In a survey from the late 1930s, it is estimated that non-employed men spent twice as much time on household work as employed men (Åkerman, 1941). The time spent on household work by employed men was quite low: for 1951 it is estimated to be only 8.4 hours per week. Assuming a work week of 48 hours, this entails a derivative of only –0.18, which is the level assumed up to 1964. From the time use survey of 1990/91 the derivative is calculated at –0.08, for 2000/01 at –0.05, and for 2010/11 at –0.06 based on the difference between employed and non-employed men. For other years, the derivative is interpolated linearly.

Similar results can be derived from the United States. According to Ramey, employed men spent 8.1 hours a week in home production in 1950, while non-employed men spent 16 hours a week.[52] This would entail a derivative of around –0.2. By 2005, from Ramey's data, the derivative can be estimated to be around –0.1. For women, the derivative can be estimated to be around –0.7 in 1950, and –0.4 in 2005.

In the present study, the estimated derivatives of unpaid work with respect to paid work are first used to adjust the data for the benchmark years. Total time spent in unpaid work is calculated as:

$$t_{UIW,\,final\,approx.} = t_{UIW,\,1^{st}\,approx.} + (t_{PW,\,final\,approx.} - t_{PW,\,1^{st}\,approx}) * D \quad (3)$$

where $t_{PW,\,1^{st}\,approx.}$ is the first approximation of paid work based on the time use studies, $t_{UIW,\,1^{st}\,approx.}$ is the first approximation of unpaid work based on the time use studies, $t_{PW,\,final\,approx.}$ is the final approximation of paid work based on data from the national accounts, and $t_{UIW,\,final\,approx.}$ is the final approximation of unpaid work adjusted for

[52] Ramey, "Time Spent", 29.

the discrepancy between time use surveys and the national accounts. The share of the various activities in total time spent on unpaid work is assumed to be the same in the final as in the initial approximation. The time devoted to personal activities is not changed, while free time is calculated as a residual.

A further aspect is that women's unpaid household work was affected by the employment of paid domestic servants. In 1950, domestic servants were still common in Sweden, but on the decline.[53] By the 1970s they had practically disappeared. The wives in households that had paid domestic servants spent less time in household work, which also tended to reduce their total working time. For example, corporate wives delegated most household tasks to domestic servants.[54]

According to a survey from 1937, housewives (performing no paid labour) with domestic servants had a working week of 48 hours, while housewives with no domestic servants had a working week of 63 hours.[55] This would imply that housewives with domestic servants worked 24 per cent less than housewives without domestic servants. Assuming a working week of around 60 hours for wives without domestic servants, and one of 50-60 hours for domestic servants in households employing them, this would mean that the derivative of hours worked by housewives with respect to hours worked by domestic servants was –0.25 to –0.3. Hence, domestic servants mainly increased the total volume of household work; only secondarily did they increase the leisure of housewives.

Since our estimate here of the work of urban housewives in 1951 is based predominantly on data for working class families, the actual hours worked by urban housewives should be lowered somewhat. The present study sets the share of housewives with domestic servants at just 4.6 per cent in 1951, derived by dividing the number of domestic servants (98,787) by the average of the number of women

[53] Nordlund Edvinsson and Söderberg, "Servants and bourgeois life", 427.
[54] Nordlund Edvinsson, *En osynlig företagshistoria*, 131.
[55] Wohlin, "En rundfråga", 6; Nyberg, *Tekniken*, 132.

and men in the age group of 20-64 (2,136,000). This means that the hours worked by housewives only have to be lowered by 1 per cent to take into account the fact that urban housewives with domestic servants worked less.

A first approximation is estimated for non-benchmark years by simple linear interpolations, which represent the long-term changes. Further adjustments are made according to formula (3) and the estimated derivatives of unpaid work for women and men. The derivatives/elasticities are (by assumption here) only short-term relations. In the long term, men increased their time in household work when they worked less in paid labour, while the opposite can be observed for women. Between 1951 and 2011 men decreased their daily work in paid labour by two hours, while they increased their time in unpaid work by 1.8 hours. Over the same period women increased their paid working time by 1.3 hours and decreased their unpaid work by as much as 3.4 hours. Some of the shifts would probably have occurred even without a change in paid hours, such as a reduction in the total hours worked in the household.

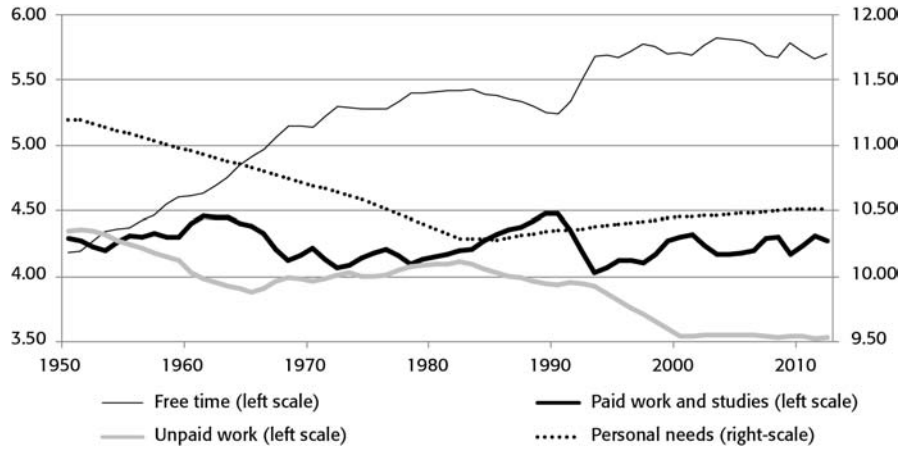
Therefore, if in the long term the increased participation of women in the paid labour force increased men's share in unpaid work, the short-term impact was modest. Annual changes in paid work probably affect the gendered division of labour with some lag. For example, comparing benchmark years the most substantial reduction in paid work by men came between 1964 and 1974, while the largest increase in men's participation in household work came between 1974 and 1982.

## 5. Analysing trends

Figure 1 presents the daily time use for an average person aged 20 to 64, making no distinction between women and men. Paid work and study are grouped together. By the third-person standard, study does not count as a productive activity, but it clearly differs from other leisure activities since it is oriented towards future benefits,

and could therefore be viewed as part of the work process in a broader sense. It also contributes to the accumulation of human capital. Since unpaid work includes travel, Figure 1 classifies travel to work as paid work, even if this time is not paid and is not included in the official statistics of hours worked. Meals at the workplace are reclassified as personal needs.

**Figure 1**
Daily time use for an average person in Sweden aged 20 to 64, 1950-2012

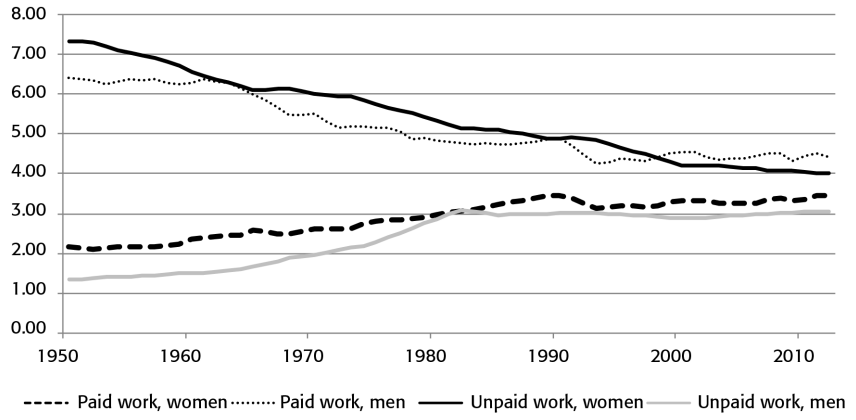



Sources: Paid work: Statistics Sweden, *Sysselsättning 1960-1974*; Statistics Sweden, *Sysselsättning och lönesummor 1963-1980*; Statistics Sweden, *Sysselsättning och lönesummor 1970-1985*; Statistics Sweden, *Produktion och sysselsättning*; Statistics Sweden. "Nationalräkenskaper"; Statistics Sweden, *Statistisk årsbok*. Other time uses: see Table A1. Paid work here includes travel to work, but meals during working time are reclassified as personal needs.

At an average of between 4 and 4.5 hours per day per person, the total time spent on paid work and study was surprisingly stable between 1950 and 2012. Since unemployment in 2012 was much higher than in 1950, there was some long-term increase in labour supply.

Women's increased participation in the workforce was almost exactly mirrored by a reduction in the hours worked by men. This can be observed in Figure 2, which depicts average daily time devoted to paid and unpaid work by women and men.

**FIGURE 2**
Average time per day in paid and unpaid work among women and men aged 20 to 64, 1950-2012




Sources: Table A1 and Figure 1. Paid work here excludes travel to work and meals during working time.

Paid work accounted for 23 per cent of women's total work time in 1950 and 47 per cent in 2012. For men, the proportion decreased from 82 to 58 per cent during the same period. Free time has increased, but this is mainly due to decreased time devoted to unpaid work and time spent on personal needs.

The feminization of the paid workforce was not a linear process, and there were several reversals of trend. During the 1940s and 1950s women's participation in paid work declined. Since the 1990s, the convergence has been frozen. The number of paid hours worked by women compared to men was lowest in the 1950s, the classical period of the breadwinner-homemaker household model.

Between 1960 and the early 1990s the ratio of women's to men's paid work increased steadily. Women's position as housewives was unlocked. In 1971, Sweden introduced separate taxation, which gave women an incentive to increase their paid work. The rate of change peaked around 1980. An important factor behind the gender revolution was the increasing relative wage of women, which followed

the shortening of paid work time for men. According to a study by Svante Prado (2010), in manufacturing this wage convergence came mainly in the 1960s and 1970s. As Becker notes, the increased relative income of women, which could be observed in most Western countries in the second half of the 20th century, raised the relative cost of the time dedicated to unpaid activities, which induced higher participation of married women in the paid workforce.[56]

The total time in unpaid and paid work has decreased for both men and women, but much more for women. Women worked about 2 hours more per day than men in 1950, but by 2012 this difference had disappeared, even if the change in free time was not as dramatic. This result accords quite well with the hypothesis that a more equal division of labour between genders and the strengthening of women's bargaining position caused women's total workload to decrease in relation to that of men.

Free time has increased, thanks mainly to the reduction in time devoted to unpaid domestic services and sleep. Internationally, studies show that people in higher social positions tend to compress sleep by as much as 20 minutes a day.[57] It is possible that with less physically demanding work, people are sleeping less today than in the past.

Nyberg (1989) hypothesizes that in Sweden the ratio of hours of paid employment to housework has remained relatively constant over time. The big change is rather how men and women divided their time on paid and unpaid work. The present study, which has access to three time-use surveys conducted after the publication of Nyberg's thesis, modifies her conclusions. For an average person, unpaid household work was substantially reduced, by one hour per day. However, various domestic services were affected differently, indicating a historically contingent process.

The most dramatic decrease was in the time spent on making and mending clothes, which decreased from 37 minutes a day in 1950 to 3

[56] Becker, *A Treatise*, 245.
[57] Gershuny, *Changing Times*, 219.

minutes in 2012; the main cause was probably the merchandise effect. Due to the faster increase in wages than in the price of clothes, it was simply no longer rational to make one's own clothes. Nevertheless, in the 1940s the value of the clothes women produced in one hour was equivalent to what they earned as factory workers. Purchases of ready-made clothes increased by 7.5 per(cent per year between 1931 and 1950, and by 4 per(cent per year between 1950 and 1970.[58]

Time spent for laundry was halved, in spite of the increased consumption of clothes, while cooking, baking and washing dishes together were reduced from 76 to 47 minutes a day, and cleaning from 43 to 26 minutes. These changes can be linked to the combination of the technology and merchandise effects. The 20th century saw the introduction of a whole series of household appliances. Between 1948 and 1990 the proportion of households with washing machines increased from 1 to 75 per(cent, those with vacuum cleaners from 55 to 100 per(cent, dishwashers from 0 to 44 per(cent, and refrigerators from 19 to 100 per(cent.[59] A report from 1937 shows that while washing laundry by hand took 30 minutes per kilogram of clothes, doing the laundry by machine took just 10 minutes.[60] According to a Gallup study, 78 per cent of Swedish households had a vacuum cleaner and 17 per cent a refrigerator in 1946.[61] According to another Gallup study, in 1954 only 13 per cent of households had their own washing machine, but it should be borne in mind that many households had access to washing facilities outside the home.[62]

A contrary trend is displayed by shopping, which increased from 7 to 22 per cent of total unpaid work time, or from 18 to 46 minutes per day. The main factor here was the increase in the per capita private consumption of goods. For this activity, the consumption effect clearly outweighed other effects.

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[58] Svensson, "Technology", 12.
[59] Svensson, "Technology", 7.
[60] 1937 års utredning angående det mindre jordbrukets arbetsförhållanden, *Underlättandet*, 125.
[61] Svenska Gallupinstitutet, *Kylskåp och dammsugare*.
[62] Svenska Gallupinstitutet, *Förekomsten av tvättmaskiner*.

Technology has negligible effects on childcare, but there is a significant merchandise effect. The total time devoted to care of one's own children did not change, and stood at around 35 minutes in 2012 as in 1950 (the estimate for 1951, however, is based on the assumption of no change between 1951 and 1964). In other countries, the time devoted to childcare increased.[63] In Sweden, publicly funded childcare, which expanded from the 1970s onwards,[64] may have counteracted that tendency.

Although Nyberg finds that among full-time working women, unpaid household work increased between the 1950s and the 1980s, this was partly the result of the shorter paid work week, and was countered by the decrease in the number of housewives.[65] The important issue here – the focus of the present study – is how unpaid household work has changed for the average woman.

Between 1950 and 2012, women's unpaid work was reduced by more than 3 hours per day, but over the period the rate of decrease decelerated. A similar development to that in Sweden can be observed for the United States, although the reduction in unpaid work was not as dramatic.[66] While the average American man aged 18-64 increased his weekly time dedicated to home production from 9 to 16.8 hours between 1950 and 2005, the American woman decreased that time from 41.5 to 29.3 hours. For women, the reduction was half as great as that for Swedish women over the same period.

The reduction in unpaid work for women can be decomposed into two factors: the increase in that of men and the overall decline in the time spent on unpaid work. Each factor accounted for around half of the decline.

Figure 3 shows the contribution of each factor, measured in hours of reduced unpaid work for women per decade. To eliminate

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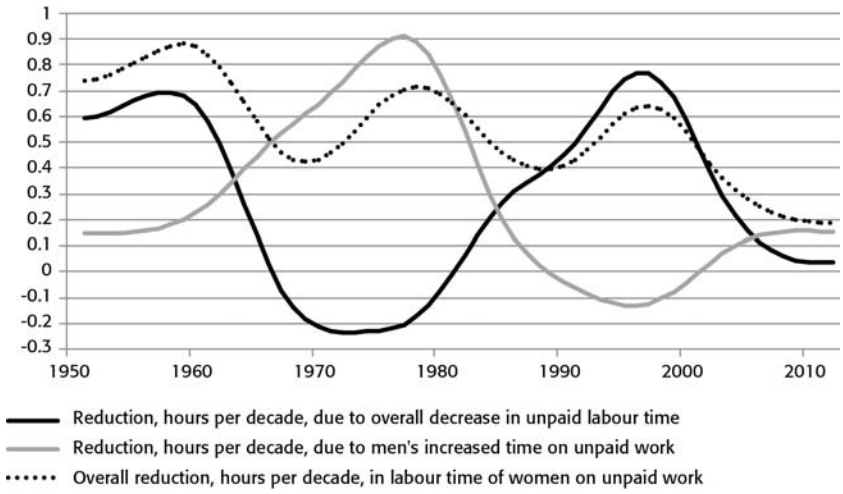
[63] Gershuny, *Changing Times*, 199; Sullivan and Gershuny, "Cross-national changes", 341.
[64] Svensson, "Technology", 19; Ploug, "The Nordic", 518.
[65] Nyberg, *Tekniken*, 267.
[66] Ramey, "Time Spent", 27-9.

short-term fluctuations, the calculations employ an HP filter, with λ = 100.

**Figure 3**
Factors affecting the reduction in women's unpaid work, 1950-2012




Sources: Table A1 and Figure 1.

From Figure 3, four periods can be identified. Since econometric tests of structural breaks would be inappropriate, given the relative unreliability of the interpolation of annual data, these periods are identified through visual inspection:

1. In the period 1950-1963, the rate of the reduction was highest. Women's unpaid work was reduced by more than 1 hour. However, during the 1950s women did not increase their paid labour force participation, and in the early 1960s there was only a small increase, even if part-time work was quite common.[67] Men's increased participation in household work was of only minor importance. The main factor in shortening women's unpaid work was the overall reduction in unpaid housework. The technology

[67] Stanfors, *Education*, 117-21.

and merchandise effects clearly outweighed the consumption effect. Paid domestic services almost disappeared in this period, which is an opposite merchandise effect, but overall there was a shift towards the market. The main component of the merchandise effect was the reduction in the time given over to making and mending clothes. Time for washing dishes, laundry and cleaning was also reduced, thanks to the spread of household appliances.[68]

2. In the period 1963-1984, the reduction in women's unpaid work, by a further 1 hour per day, is explained mainly by the increase in the time devoted to such activity by men. This was also the period when men's paid work was reduced most sharply, the work week being shortened from 48 to 40 hours while vacations were lengthened from three to five weeks.[69] A corresponding change was the increased participation of women in paid labour, which in turn was mirrored by the expansion of the public sector. Lennart Schön argues that many activities previously performed at home were transferred to the paid sector.[70] The reduction in men's working time turned substantial after 1963, with a diminution of 1.5 hours between 1963 and 1984. This reduction may have caused men, after some delay, to take more responsibility for domestic work, which accords quite well with theories of cooperative conflict emphasizing the bargaining position of women. In the US too, men increased their unpaid work in this period.[71] In Sweden, since men's unpaid work increased more than women's unpaid work diminished, the total unpaid work per capita actually increased somewhat. The main factor between 1963 and 1984 was increased time spent on shopping.
3. In the period 1984-2005 the main factor behind the shortening of women's unpaid work was the reduction in total time de-

[68] See Svensson, "Technology", 8-9.
[69] Eriksson, *Arbetstiden*, 10.
[70] Schön, *En modern*, 478.
[71] Sayer, "Gender", 292.

voted to unpaid work, by around 1 hour. Once again, the technology and merchandise effects outweighed the consumption effect. Men increased their unpaid work time up until 1982, but since then it has not changed much. During the 1990s the trend rate of reduction in women's unpaid work due to the male contribution was actually negative, despite the fact that the effect of parenthood changed during this decade to affect women and men more equally.[72] Women's paid work reached a maximum in 1989 and has not surpassed that level since then. This was mainly due to the economic crisis of the early 1990s, which decreased the paid working hours of men even more. The expansion of the public sector also ceased in the 1980s.

4. In the period 2005-2012 the trend rate of reduction in women's unpaid work reached a low of 0.2 hours per decade around 2010 as compared to 0.9 hours per decade around 1960. The slowness of progress here is explained mainly by a modest rebound in men's unpaid work. The financial crisis of 2008-2009 did not have the same negative impact on women's paid work as the recession of the early 1990s. Already in 2011 women's hours of paid work had surpassed their 2008 level (but not that of 1989).

This periodization shows that although the shortening of women's unpaid work was a long-term trend, different mechanisms were at work in different periods and for different household tasks.

## 6. Concluding remarks

This paper estimates the annual time use in Sweden for the period 1950-2012. Our main primary sources are various household surveys of time use, although they cannot be used in a simple or straightforward way. Only the last two Swedish time use surveys, conducted in 2000/01 and 2010/11, are satisfactory from the point of view of covering the whole working age population during an

[72] Dribe Stanfors and Buehler, "Does Parenthood Strengthen", 36.

average day, and their estimates of paid work deviate from those of the national accounts. Earlier time use surveys must be adjusted to take into account the use of time during summers and on holidays and by excluded groups. By calculating the elasticity of unpaid work with respect to paid work, assuming a constant derivative of unpaid work, the study develops a technique for making this adjustment, which is also used to interpolate the annual data.

Although the calculations and adjustments made here are based on assumptions that are open to question, as Charles Feinstein points out, "it is better to move, however uncertainly, in the right direction than to stand firmly in what one knows to be the wrong position."[73] Since the methodology between different time use surveys varies substantially, straightforward comparisons are biased. Narrative accounts, however reliable at the micro level, cannot serve to quantify time use at a macro level, if we want to explain historical shifts in the gendered division of labour. The alternative, namely disregarding time use surveys altogether, would keep us in continued ignorance about the historical evolution of the gendered division of labour.

During the period, most unpaid work in Sweden was taken over by people in full-time or part-time paid employment.

Sweden is often viewed as a model for countries striving towards equality between women and men. The gendered division of labour is smaller than in other industrialized countries.[74] Our data suggest that different mechanisms have contributed to generating the present situation.

The data reconstructed by the present study indicate that two factors contributed to the shortening of women's unpaid domestic work in Sweden from the mid-20th century to the early 2010s: the overall decrease in unpaid domestic work and the increased participation in it by men thanks to the reduction in paid work hours.

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[73] Feinstein, *National income*, 152-3.
[74] Gershuny, *Changing Times*, 187-194; Anxo et al., "Gender Differences"; UNDP, *Human Development Report*, 156; Gärtner, "German stagnation".

Household models based on the assumption of one commodity produced by the household are too crude to fully account for this process, given that various household services were affected differently in different periods. To analyse the evolution of the gendered division of labour we use Anita Nyberg's distinction between the technology, consumption and merchandise effects on various household tasks.

The technology and merchandise effects on household work dominated the consumption effects. There was a long-term decline in total time spent on unpaid domestic services. Various domestic tasks were affected differently in different periods. For example, while time spent on clothes making and mending has been dramatically reduced, the time given over to shopping has increased. Overall, the total number of hours devoted by women to unpaid household work has decreased much more than their paid work has increased. The Swedish case yields some support for the thesis of convergence in time use of women and men. Women's double burden was more a phenomenon of the 1950s than the 2010s.

The reduction in the amount of time spent on household tasks was most likely a major factor in the start of the rise in women's labour market participation during the 1960s. The marginal productivity of some household tasks, such as making clothes and baking bread, decreased substantially in the post-war period by comparison with wage labour. In the UK and the US, there was a similar downward trend in housework from the end of the 1950s, whereas in the preceding decades it had been quite stable.[75]

The gendered division of labour moderated substantially between the early 1960s and the early 1990s. The reduction in men's paid working hours did not immediately increase their participation in household work, but in the long term it was accompanied by a substantial shift. Women increased their share in paid work and men increased their share in unpaid household work. Burda, Hamermesh

[75] Gershuny, "Cross-national changes", 335.

and Weil similarly find a negative relationship between GDP per capita and the gender difference in total work.[76]

Despite the shortening of the working week and the lengthening of vacations, the average time spent on paid work and study has not decreased for 20-64-year-olds.

## Bibliography

1937 års utredning angående det mindre jordbrukets arbetsförhållanden, *Underlättandet av kvinnornas arbete i de mindre lanthemmen Betänkande med förslag avgivet den 25 februari 1939 av 1937 års utredning angående det mindre jordbrukets arbetsförhållanden*, Statens Offentliga Utredningar, 1939:6, Stockholm.

Agarwal B. (1997), "Bargaining' and Gender Relations: Within and Beyond the Household", in *Feminist Economics*, no. 1, pp. 1-51.

Åkerman B. (1941), *Familjen som växte ur sitt hem*, Stockholm.

Anxoa D., Mencarinib L., Pailhéc A., Solazd A., Letizia Tanturrie M., Flood L. (2011), "Gender Differences in Time Use over the Life Course in France, Italy, Sweden, and the US", in *Feminist Economics*, no. 3, pp. 159-195.

Bianchi S., Milkie M., Sayer L., Robinson J. (2000), "Is Anyone Doing the Housework? Trends in the Gender Division of Household Labour", in *Social Forces*, no. 1, pp. 191-228.

Becker G. (1981), *A Treatise on the Family*, Cambridge and London.

Boalt C. (1961), *1000 husmödrar om hemarbetet*, Stockholm.

Burda M., Hamermesh D., Weil P. (2013), "Total Work and Gender: Facts and Possible Explanations", in *Journal of Population Economics*, no. 1, pp. 239-261.

Cowan R.S. (1983), *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*, New York.

deVries J. (2008), *The Industrious Revolution: Consumer Behaviour and the Household Economy, 1650 to the Present*, Cambridge.

[76] Burda, Hamermesh and Weil, "Total work".

DRIBE M., STANFORS M., BUEHLER C. (2009), "Does Parenthood Strengthen a Traditional Household Division of Labor? Evidence From Sweden", in *Journal of Marriage and Family*, no. 1, pp. 33-45.

EDVINSSON R. (2009), "Ekonomisk tillväxt, genusarbetsdelning och obetalt hemarbete i historisk belysning", in *Historisk Tidskrift*, no. 1, pp. 5-26.

ERIKSSON K. (2001), *Arbetstiden □lag eller avtal*, SOU 2001:91, Stockholm.

EUROSTAT (2003), *Household Production and Consumption: Proposal for a Methodology of Household Satellite Accounts*, Luxemburg.

FEINSTEIN C. (1972), *National Income, Expenditure and Output of the United Kingdom 1855-1965*, Cambridge.

FISHER K., EGERTON M., GERSHUNY J., ROBINSON J. (2007), "Gender Convergence in the American Heritage Time Use Study (AHTUS)", in *Social Indicators Research*, no. 1, pp. 1-33.

GERSHUNY J. (2000), *Changing Times: Work and Leisure in Postindustrial Society*, Oxford.

– (2011), *Time-Use Surveys and the Measurement of National Well-Being*, Swansea.

GRABÖ P. (1952), *Arbetstiden för kvinnor i jordbrukarhushåll*, Stockholm.

GREENWOOD J., SESHADRI A., YORUKOGLU M. (2005), "Engines of Liberation", in *Review of Economic Studies*, no. 1, pp. 109-133.

GÄRTNER S. (2014), "German Stagnation versus Swedish Progression: Gender Wage Gaps in Comparison, 1960-2006", in *Scandinavian Economic History Review*, no. 2, pp. 137-162.

HIRWAY I., JOSE S.)(2011), "Understanding Women's Work Using Time-Use Statistics: The Case of India", in *Feminist Economics*, no. 4, pp. 67-92.

HOLM L. (1955), *Familj och bostad: en redovisning av fem fältstudier i moderna svenska familjebostäder 1951-1954*, Stockholm.

JUNGENFELT K. (1959), *Lönernas andel av nationalinkomsten: En studie över vissa sidor av inkomstfördelningens utveckling i Sverige*, Uppsala.

KALENKOSKI C.M., FOSTER G. (eds.) (2015), *The Economics of Multitasking*, London.

Konsumentverket (1977), *Tid och arbete i hushållen: 110 barnfamiljer i Stockholm: förstudie*, Stockholm.
– (1982), *Svenska folkets tidsanvändning 1981: sammandrag av en undersökning av tidsåtgången för olika hemarbetsaktiviteter*, Vällingby.
– (1984), *Tids nog: en undersökning om svenska folkets tidsanvändning: 1982 och 1983*, Vällingby.
Krantz O. (1987), *Husligt arbete 1800-1980*, Lund.
Lindahl E., Dahlgren E., Kock K. (1937), *National Income of Sweden 1861-1930, part one and two*, London and Stockholm.
Mokyr J. (2000), "Why More Work for Mother?': Knowledge and Household Behavior, 1870-1945", in *The Journal of Economic History*, no. 1,pp. 1-41.
Nilsson M. (2015), *Taking Work Home: Labour Dynamics of Women Industrial Homeworkers in Sweden During the Second Industrial Revolution*, Gothenburg.
Nordlund Edvinsson T., Söderberg J. (2010), "Servants and bourgeois life in urban Sweden in the early 20th century", in *Scandinavian Journal of History*, no. 4, pp. 427-450.
– (2012), *En osynlig företagshistoria: Direktörshustrun i svenskt näringsliv*, Lund.
Nyberg A. (1989), *Tekniken - kvinnornas befriare? Hushållsteknik, köpevaror, gifta kvinnors hushållsarbetstid och förvärvsdeltagande 1930-talet-1980-talet*, Linköping.
– (1995), *Hemarbetets volym och värde*, Linköping.
Ploug N. (2012), "The Nordic Child Care Regime - History, Development and Challenges", in *Children and Youth Services Review*, no. 3, pp. 517-522.
Prado S. (2010) "Nominal and Real Wages of Manufacturing Workers, 1860-2007", in R. Edvinsson, T. Jacobson and D. Waldenström (eds.), *Historical Monetary and Financial Statistics of Sweden, Exchange rates, prices, and wages, 1277-2008*, pp. 479-527.
Ramey V. (2009), "Time Spent in Home Production in the Twentieth-Century United States: New Estimates from Old Data", in *The Journal of Economic History*, no. 1, pp. 1-47.
Reid M. (1934), *Economics of Household Production*, New York.

SAYER L. (2005), "Gender, Time and Inequality: Trends in Women's and Men's Paid Work, Unapid Work and Free Time", in *Social Forces*, no. 1, 2pp. 285-303.

SCHÖN L. (2000), *En modern svensk ekonomisk historia: Tillväxt och omvandling under två sekel*, Stockholm.

SOCIALSTYRELSEN (1965), *Hemarbete och servicekontakter: två kartläggande undersökningar utförda av Familjeberedningen*, SOU 1965:65, Stockholm.

STANFORS M. (2003), *Education, Labor Force Participation and Changing Fertility Patterns: A Study of Women and Socioeconomic Change in Twentieth Century Sweden*, Stockholm.

STATISTICS SWEDEN (2012), *Statistisk årsbok för Sverige*, Stockholm 1941-2012.

– (1975), *Sysselsättning 1960-1974*, Statistiska Meddelanden, N 1975:98, Appendix 5.
– (1976), *Levnadsförhållanden Rapport nr 2 - Sysselsättning och arbetsplatsförhållanden 1974*, Stockholm 1976.
– (1981), *Sysselsättning och lönesummor 1963-1980*, Statistiska Meddelanden, N 1981:2.5, Appendix 5.
– (1986£, *Sysselsättning och lönesummor 1970-1985*, Statistiska Meddelanden, N 10 SM 8601, Appendix 5.
– (1988), *Så använder vi tiden: preliminär rapport från tidsanvändningsundersökningen*, Stockholm.
– (1992), *Tidsanvändningsundersökningen 1990/91*, Örebro.
– (1995), *Produktion och sysselsättning, detaljerade tabeller 1980-1994*, Statistiska Meddelanden, N 10 SM 9501, Appendix 2.
– (2003), *Tid för vardagsliv - Kvinnors och mäns tidsanvändning 1990/91 och 2000/01*, Örebro.
– (2012), *Nu för tiden: En undersökning om svenska folkets tidsanvändning år 2010/11*.
– (2013), "Nationalräkenskaper detaljerade årsberäkningar 1950–2011, vissa data 1950-2012", Statistikdatabasen, URL: http://www.scb.se (accessed 2013-12-02).
– (2013), "Genomsnittlig timlön och konfidensintervall, arbetare privat sektor (SLP) efter näringsgren SNI 2007, arbetstidsart och

kön. År 2008 - 2012", Statistikdatabasen, URL: http://www.scb.se (accessed 2013-11-23).
Sullivan O., Gershuny J. (2001), "Cross-national Changes in Time Use: Some Sociological (hi)Stories Re-examined", in *British Journal of Sociology*, no. 2, pp. 331-347.
Svenska Gallupinstitutet (1946), *Kylskåpochdammsugare*, URL: http://snd.gu.se/sv/files/gallup/reports/gallup_059.pdf (accessed 2015-02-21).
– (1954), *Förekomsten av tvättmaskiner*, http://snd.gu.se/sv/files/gallup/reports/gallup_397.pdf (accessed 2015-02-21).
Svensson L. (2008), "Technology, Institutions and Allocation of Time in Swedish Households 1920-1990", IFAU Working Paper 2008:20.
United Nations et al. (2009), *System of National Accounts 2008*, New York.
UNDP (2013), *Human Development Report 2013*.
Utredningen för hem- och familjefrågor (1947), *Familjeliv och Hemarbete*, SOU 1947:46, Stockholm.
Vanek J. (1974), "Time Spent in Housework", in *Scientific American*, no. 5, pp. 116-120.
Varjonen J., Hamunen E., Katri Soinne K. (2014), "Satellite Accounts on Household Production: Eurostat Methodology and Experiences to Apply It", Working Papers 1/2014, Statistics Finland.
Wohlin M. (1937), "En rundfråga till husmödrarna", in *Husmodersförbundets medlemsblad*, no. 5.

## Appendix – The estimates for benchmark years

This appendix provides complementary data for the article "New estimates of time use in Sweden 1950-2012". Table A1 and Table A2 present the estimated data for the benchmark years. The tables divide, as is common, the total time of the day into five categories: paid work, unpaid work, personal needs, study and free time. Personal needs include sleeping, personal care and eating out-

side work. Paid work here also includes meals during work and travel to work, which are actually not paid activities.

**TABLE A1**
The average time (minutes) that women aged 20 to 64 years devoted to various activities during an average day

| | 1951 | 1964 | 1974 | 1982 | 1985 | 1990/1 | 2000/1 | 2010/1 |
|---|---|---|---|---|---|---|---|---|
| Paid work | 121 | 135 | 150 | 168 | 176 | 187 | 180 | 183 |
| Meals during paid work | 4 | 7 | 7 | 8 | 8 | 9 | 9 | 10 |
| Travel to work | 8 | 13 | 14 | 16 | 17 | 18 | 20 | 21 |
| **Paid work, total** | **134** | **155** | **172** | **193** | **201** | **214** | **209** | **214** |
| Cooking | 84 | 88 | 72 | 59 | 56 | 50 | 43 | 39 |
| Washing dishes | 41 | 31 | 28 | 25 | 24 | 24 | 20 | 16 |
| Cleaning | 78 | 66 | 49 | 36 | 41 | 40 | 30 | 34 |
| Laundry | 38 | 26 | 26 | 24 | 19 | 22 | 17 | 14 |
| Baking, food production | 15 | 12 | 11 | 10 | 10 | 9 | 5 | 4 |
| Clothes making, mending | 74 | 31 | 29 | 27 | 23 | 13 | 5 | 3 |
| Chopping, etc. | 8 | 7 | 5 | 1 | 1 | 1 | 2 | 1 |
| Maintenance | 11 | 16 | 15 | 14 | 23 | 21 | 21 | 21 |
| Care of own children | 51 | 56 | 51 | 45 | 50 | 51 | 41 | 42 |
| Care of others | 4 | 6 | 8 | 9 | 8 | 9 | 9 | 8 |
| Shopping | 29 | 23 | 49 | 52 | 47 | 48 | 50 | 50 |
| Other unpaid work | 4 | 8 | 7 | 6 | 5 | 6 | 9 | 9 |
| **Unpaid work, total** | **439** | **372** | **351** | **309** | **306** | **293** | **253** | **241** |
| Sleep and personal care | 572 | 565 | 554 | 540 | 539 | 542 | 542 | 544 |
| Eating | 74 | 72 | 74 | 77 | 80 | 78 | 89 | 88 |
| Personal needs, total | 647 | 637 | 628 | 617 | 620 | 619 | 631 | 631 |
| Study | 0 | 3 | 9 | 15 | 19 | 20 | 26 | 22 |
| Free time | 220 | 272 | 280 | 306 | 295 | 294 | 321 | 331 |
| **Total** | **1440** | **1440** | **1440** | **1440** | **1440** | **1440** | **1440** | **1440** |

Sources: Worked hours: See Figure 1. Time use: Grabö, *Arbetstiden*; Holm, *Familj*; Socialstyrelsen, *Hemarbete*; Konsumentverket, *Tids nog*; Konsumentverket, *Svenska folkets tidsanvändning*; Konsumentverket, *Tid och arbete*; Statistics Sweden, *Så använder vi tiden*; Statistics Sweden, *Tidsanvändningsundersökningen 1990/91*; Statistics Sweden, *Tid för vardagsliv*; Statistics Sweden, *Nu för tiden*. See also the main text.

**Table A2**
The average time (minutes) men aged 20 to 64 devoted to various activities during an average day

| | 1951 | 1964 | 1974 | 1982 | 1985 | 1990/1 | 2000/1 | 2010/1 |
|---|---|---|---|---|---|---|---|---|
| Paid work | 351 | 338 | 284 | 261 | 262 | 262 | 243 | 241 |
| Meals during paid work | 20 | 19 | 16 | 14 | 15 | 14 | 14 | 15 |
| Travel to work | 33 | 32 | 27 | 25 | 22 | 25 | 28 | 28 |
| **Paid work, total** | **404** | **389** | **327** | **300** | **299** | **302** | **286** | **283** |
| Cooking | 8 | 9 | 15 | 20 | 23 | 23 | 23 | 26 |
| Washing dishes | 4 | 4 | 7 | 10 | 8 | 9 | 10 | 9 |
| Cleaning | 7 | 8 | 11 | 13 | 14 | 17 | 16 | 18 |
| Laundry | 2 | 2 | 4 | 6 | 2 | 4 | 3 | 4 |
| Baking, food production | 0 | 0 | 1 | 2 | 0 | 2 | 2 | 1 |
| Clothes making, mending | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| Chopping, etc. | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 4 |
| Maintenance | 25 | 28 | 40 | 54 | 46 | 41 | 34 | 37 |
| Care of own children | 17 | 19 | 22 | 26 | 23 | 25 | 25 | 28 |
| Care of others | 2 | 2 | 2 | 3 | 8 | 10 | 8 | 8 |
| Shopping | 6 | 11 | 19 | 42 | 37 | 40 | 41 | 42 |
| Other unpaid work | 7 | 8 | 7 | 5 | 6 | 6 | 8 | 7 |
| **Unpaid work, total** | **82** | **97** | **132** | **186** | **179** | **182** | **173** | **183** |
| Sleep and personal care | 588 | 570 | 549 | 522 | 512 | 525 | 519 | 524 |
| Eating | 84 | 68 | 70 | 72 | 79 | 74 | 81 | 82 |
| Personal needs, total | 672 | 638 | 619 | 594 | 591 | 599 | 601 | 606 |
| Study | 0 | 7 | 11 | 16 | 21 | 17 | 18 | 17 |
| Free time | 282 | 309 | 353 | 344 | 350 | 340 | 362 | 351 |
| **Total** | **1440** | **1440** | **1440** | **1440** | **1440** | **1440** | **1440** | **1440** |

Sources: see Table A1.