

85 YEARS OF US RURAL WOMEN'S TIME USE

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ABSTRACT

Between 1924 and 1931, the United States Department of Agriculture collected approximately 900 week-long time-use diaries from US 'homemakers'. Described in the academic literature as the 'Farm Women's Studies', nevertheless the sample also included women from small towns and villages. 566 of the weekly time use 'summary records', containing totals of time allocated to 58 everyday activities across the 168-hours of the diarists' weeks, have been re-discovered in the US National Archives. Although these records do not include biographical information about the diarists, they do provide their names and postal addresses. Research at the CTUR has identified more than 95% of these diarists in one or more of the 1920, 1930 or 1940 US Federal censuses, allowing accurate estimation of ages and reconstruction of respondents' occupational and family circumstances. We use the resulting individual-level dataset to extend the modelling of rural women's time use trends backwards from the modern American Time Use Study and the 1975 Michigan Time Use Survey to the new 1920s evidence. We find, after controls for demographic and economic circumstances, consistent trends through the 85 year period: substantial decreases of time in routine household operations, and substantial growth in childcare and shopping time.

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1. INTRODUCTION

Summary

We have been working on materials from what are sometimes referred to as the *Purnell Act time diary studies* (Ramey, 2009) collected by the United States Department of Agriculture (USDA), the very earliest time diaries collected in the USA. Bevan (1912), who is sometimes identified in the literature as the pioneer researcher in this field, did not in fact use a true diary method, whereas Kneeland's USDA diary approach, first reported in 1929, formed the basis for academic sociological studies during the 1930s (e.g. Lundberg *et al.*, 1934).

Anne Effland, a Senior Social Science Analyst at the USDA, re-discovered part of the manuscript individual-level micro-data from these early diary studies (detailed aggregate totals of time devoted to different activities, plus a smaller number of the original diaries) in the US National Archives. However, these materials are incomplete, with no information on the personal circumstances and household conditions of the farm and town 'homemaker' diarists. Complete records including seven-day diaries, 'supplementary' questionnaires and 'summary records' survive only for 77 of the elite 'College' women surveyed by Kneeland in 1930 and 1931 (materials not used in this paper).

All of the 643 individual-level weekly 'summary records' or 'time budgets' (566 farm and town women, 77 College women) that we have so far examined include the diarists' family names or initials (often the husband's) and postal addresses. We have used this information to identify all but a very few of these (95 percent overall, 93 percent of the rural women) with records in one or more of the US Federal Censuses, from which we were able to make inferences about their personal and household circumstances at the time they completed the diaries. We have concluded that the surviving 'summary records' include a majority of the original 1924 to 1928 farm and other (rural) women who provided diaries for the USDA. In this paper, we explore, amongst other issues, one of the enduring puzzles in time use research: does domestic 'labour-saving' equipment in fact reduce the amount of time devoted to domestic labour?

Background

The *Report of the Country Life Commission* (1908) was appointed by President Theodore Roosevelt (Ellsworth, 1960) to prepare a report on the current living conditions of rural life in the United States and the "systematic investigation of deficiencies" (Barron, 1984, p. 114). It was the first important stimulus to federal and state funded research into the "problems of American rural society" (Pinkett, 1984, p. 366). The 1925 *Purnell Act* authorized the US State Experiment Stations to use federal funds for research into the "economic and social problems of agriculture" (Pinkett, 1984, p. 368) by undertaking studies in rural sociology, and agricultural and home economics to "help improve agricultural life" (Kunze, 1988, p. 132). Most of the early studies conducted under the *Purnell Act* focused on rural organisations, population trends, health and the living standards of rural families (Beale and Steece, 1931). The *Bankhead-Jones Act* of 1935 enabled the Experiment Stations to expand their sociological research programmes.

Home economics and early US time diary studies: 1920 – 1930s

Home economics, which emerged in the USA as a field of research at the end of the 19th century, is the study of “all things relating to our domestic environment, including our roles as consumers of domestic goods” (Elias, 2011, p. 97). Apple and Coleman (2003, p. 106) identify the goal of home economics as “the application of scientific knowledge to the family and the community”. The USA in the 1930s was still predominantly rural, so the American domestic economy movement between 1890 and 1930 centred on the “roles, duties, challenges and education” of rural women (Holt 1995, p. 3). Holt stresses that it is important to distinguish between basic home maintenance ‘housekeeping activities’ and much more complex ‘homemaking’, which focused on reducing labour and saving time by increasing the homemaker’s efficiency, with the goal of achieving “economy in time, money and work” (1995, p. 4).

In 1923, the USDA established the Bureau of Human Nutrition and Home Economics (BHNHE), with Louise Stanley as its first (and only) female chief. The Bureau opened up “new avenues of advancement in the administrative as well as the research field” (Baker, 1976, p. 196). Hildegarde Kneeland, a University of Chicago PhD in economics and subsequently the co-author of a pioneering statistical study of US Family Income and Expenditure (Kneeland *et al.* 1941) was appointed Chief of the Economics Division of the BHNHE (Baker, 1976). Time budgets were one of the approaches developed by USDA home economists to investigate homemakers’ efficiency. The USDA’s methodological innovation in this field guided subsequent academic sociological researchers. Lundberg *et al.* (1934, p. 89) in their large-scale pioneering study of suburban *leisure*, used “essentially the same technique” that Kneeland employed in her studies of (largely rural) women’s *work*.

The earliest time use studies were collaborative projects undertaken between the USDA, Agricultural Experiment Stations and land-grant universities (McCulloch, 1981; Walker and Woods, 1976). Most of the early research focused on the long working hours and living conditions of rural homemakers, although rural non-farm and town homemakers were included in a number of studies. The programmes differed somewhat between states, with researchers using slightly different data collection methods. Nevertheless, used with caution, the combined studies offer useful insights into US household work patterns in the first half of the twentieth century (McCulloch, 1981; Walker and Woods, 1976).

Over the periods 1924 to 1928, and then 1930 to 1931, the Bureau collected whole-week diary records from (women) ‘homemakers’ in rural and urban areas. The earlier group included both farm households (559, 69% of the total) and non-farm homes (249, 31% of the total) in open country or in towns and villages of fewer than 2500 people (USDA, 1944, p. 1). The 566 summary records discussed in this paper are, we contend, a sub-set of these 808 diarists. Kneeland’s 1929 *Annals* article, which sets out what we suspect to be the first ever statement of the modern economists’ case for extensions to National Accounts to recognise and include the monetary value of women’s unpaid domestic work, is based in part on these studies, and we suspect that our data derive from her own working materials.

Studies of rural and town homemakers’ use of time were carried out in a number of states including: Nebraska (Clark & Gray, 1930); Idaho (Crawford, 1927); Washington (Arnquist & Roberts, 1929); South Dakota (Wasson, 1930); Oregon (Wilson, 1929); Rhode Island (Whittemore & Neil, 1929); South Carolina (1927-1929); and Montana (Richardson, 1933). Findings from these studies are published in Agricultural Experiment Station and USDA

Bulletins. We note that, whilst the majority of our 566 cases come from California, New York and Michigan States, we have so far found no publications explicitly from these three states.

The primary data from all these studies have been missing for a number of years. Vanek (1974, 1978), Ramey (2009) and others have cited figures from tabular results published in various USDA *Bulletins* (e.g. Wilson, 1929) in their papers on the impact of household technology. We are the first researchers to use the original micro-data since the USDA *Bulletins* were published. In what follows, we deploy the early time use materials we have so far reconstructed and analysed, together with more recent evidence from the American Heritage Time Use Study (AHTUS) (Fisher *et al.* 2011) to provide a general picture of change in US women's time use over an 85-year period. In particular, we discuss the controversial claim, made originally by Vanek (1974) – that domestic equipment does not save domestic work time.

2. THE 'HOUSEWORK TIME PARADOX'

Changes in time use over historical time

The 'housework time paradox' was formulated by Vanek on the basis of a secondary analysis of published tables from the *Purnell Act* time diary studies: "As one might expect, working women spend less time in housework than their mothers and grandmothers did some 50 years ago. Women who are not in the labor force however, spend just as much time" (1974, p. 116). What then is the impact of supposedly 'labour-saving' equipment in the home? Vanek's 1974 *Scientific American* article has been well-publicised and widely debated. It parallels a somewhat more nuanced secondary analysis of similar historical materials by Converse and Robinson (1974).

Mokyr (2000) terms this "just as much time" phenomenon the 'Cowan paradox', referring to Schwartz-Cowan's *More Work for Mother* (1980). He adds to Cowan's own explanation of the (supposed) phenomenon in terms of the spread of middle class standards of domestic comfort, an additional household-level reflection of the public understanding of the importance of sanitary improvements and personal hygiene in maintaining good health (Mokyr, 2000). Neither Cowan nor Mokyr, however, provide any direct empirical evidence of historical change in time use.

Several researchers, most recently Ramey (2009) and Bittman, Rice and Wajcman (2004) express concerns about this historical account of unchanging time devoted to housework. The figures presented by Vanek in her 1974 article are themselves not entirely supportive of the popular version of this thesis. In particular, there is an uncomfortable slide from the more specific term 'housework' (i.e. cleaning, cooking and laundry) used in the previously quoted opening sentence of the article, which has an obvious and direct relation to domestic equipment, and the more general term 'household work' used without comment in the later statistical section of her paper.

Household work, in Vanek's (1978) analysis, adds childcare, domestic management, domestic travel and shopping time to housework, activities that have a much less direct connection to household equipment¹. These latter activities have unquestionably (both in

¹ We note that Vanek's later and more extended (1978) analysis of the same materials contains neither the elision of unpaid work categories, nor the claim of constancy of housework.

Vanek's transcription of the original published tables and our own reanalysis of the reconstructed individual data) increased since the 1920s. The issue remaining to be resolved relates to the specific category 'housework'.

Irrespective of the housework/*household* work issue, the basis for Vanek's assertion of non-employed women spending "just as much time" (1974, p. 116) is rendered problematical, as Ramey (2009) observes, by two connected statistical issues; unobserved heterogeneity and sub-sample selection. Vanek's claim rests on the assumption that the time devoted to unpaid work activities of non-employed 'homemakers' over the period from the 1920s to the 1960s remains constant. However, over this period the number of women moving into paid employment increased dramatically. Fewer than 10% of married US women had paid jobs in the 1920s, whilst more than 40% had jobs in the later 1960s, and the proportion has continued to rise.

We may sensibly hypothesise that the heavier the burden of household work (based on the number and age of children, size and condition of home and garden, etc.), the greater the disincentive for women taking on the additional burden of paid employment. As more married women entered the workforce, the average characteristics of the *remaining* homemakers' households changed, following our hypothesis, with a steady increase in the proportion with larger houses and gardens, younger and more demanding children, and so on – a 'selection effect'. The range and scale of tasks undertaken by the 1960s wives who *remained* dedicated homemakers was, by this argument, broader and more comprehensive than in the 1920s. Or to put it another way, the average homemaker remaining outside waged work in 2010, carries much heavier household burdens than her unwaged counterpart did in 1925.

The historical changes in the process of 'selection' into homemaking, implying changes in the household circumstances of the average homemaker, mean that homemakers' housework time totals are not strictly comparable over successive points in time. What we see in Vanek's (1974) historical comparison may be, in essence, an inter-temporal race between the labour-saving effects of domestic equipment and the increasing average burden of cooking, cleaning and laundry on a diminishing group of increasingly hard-pressed housewives. Schwartz-Cowan's (1983) and Mokyr's (2000) inference that, given the diffusion of labour-saving equipment over this period, the observed constancy in household work time is attributable to higher standards, takes no account of this progressive historical selection of homemakers into ever-more burdensome households. Even if we were to find evidence of Vanek's historical constancy in non-employed women's housework, the comparison would be effectively vitiated by the problem of unobserved (or, more precisely un-controlled-for) heterogeneity.

A fallacy: cross-sectional differences do not imply historical changes

The problem is made more confusing by the cross-sectional version of the Vanek-Cowan paradox, which can be traced back to a slightly earlier source. Robinson, Converse and Szalai (1972) identified a weak or even negative cross-sectional association between national averages of time devoted to housework and the nationally available levels of domestic equipment, which emerged from the 1965 UNESCO-funded 12-nation cross-national time use study. They remarked that "...there might well be a fully counter-intuitive relationship between the efficiency of domestic technology and the amounts of time given over to

household obligations” (Robinson *et al.*, 1972, p. 125)². But it would be fallacious to infer from this relationship that any future diffusion of labour-saving equipment would be accompanied by increases in housework time.

More recent debates on the cross-sectional version of the thesis – that households with greater access to domestic technology spend more time in housework – illustrate the nature of the fallacy. For example, Bittman *et al.*, (2004) claim that owning specific items of domestic equipment causes household members to spend more time (or at least fail to significantly reduce time in) various domestic tasks, irrespective of whether or not those tasks are directly associated with the particular equipment. For example, Bittman *et al.*, (2004) suggest that owning a lawnmower or edge-trimmer increases the amount of time men allocate to gardening (by 9 minutes per day, one hour per week) and housework in general (15 minutes per day, one hour 45 minutes extra housework per week) “even when the type of dwelling (for example, free-standing bungalow versus apartment) is held constant” (Bittman *et al.* 2004 p. 410, Table A3).

We view this as an extraordinary mis-statement of the likely causal priority: much more likely, it is some aspect of the household circumstances that leads *both* to the acquisition of domestic equipment *and* to a higher level of housework time. Apartments and bungalows, as well as any gardens attached to them, may be of any size, just as one three-year-old child may impose very different burdens from another, and the extent of housework required may vary independently of household income. So merely entering the type of housing, level of income, numbers and ages of children and so on, as controls in a regression equation predicting housework, nevertheless leaves heterogeneity insufficiently controlled-for.

Straightforwardly, it is the on-average larger houses and gardens of owners of lawnmowers, dishwashers, and so on, that lead to the extra housework or gardening, and emphatically *not* their access to the equipment. At any and each point in historical time, owners of more labour-saving equipment might spend longer in housework than do owners of less equipment. Nevertheless, we conjecture that, as time passes and more labour saving equipment diffuses across households, *average* housework time might still be declining. And indeed, in what follows, we ~~do~~ unambiguously show such a decline amongst US rural women since the 1920s.

We will see that the story for those *other* activities, childcare and shopping, that make up the margin between Vanek's ‘housework’ and her ‘household work’, is quite different. Childcare time requirements have been transformed by parallel increases in levels of perceived challenges to child safety, and needs for higher levels of parental investment in children's human capital (Bianchi, 2000, Sayer et al 2004) and other processes discussed below. Shopping (up to the present at least) has been affected by technical and organisational changes that, from the 1930s to the 1960s in the US, replaced neighbourhood stores (perhaps with delivery services) plus mail-order for larger purchases, by relatively distant self-serviced supermarkets, requiring substantial increases in shopping and related travel time.

² Somewhat similar claims based on cross-sectional comparisons also emerge in some of the 1930s USDA *Bulletins*.

3. DATA AND SAMPLE RECONSTRUCTION METHODS

Original data collection: Farm and non-farm rural women

The homemakers participating in Kneeland's rural homemakers study were asked to complete a detailed record of their time use for seven consecutive 24-hour periods. The time devoted to various homemaking tasks by other household members, as well as paid help, was also recorded. The homemakers described activities in their own words, listing them consecutively as they occurred throughout the day, with a minimum interval of five minutes (USDA, 1944). The USDA material includes several versions of the activity coding frame (1925, 1926 and 1928) with only a few minor differences, which include 58 activities: 31 relating to unpaid work, 18 to personal care and leisure, and 9 to farm and other paid work (see Appendix Table A1).

The only rural homemaker information recovered to date is the researcher-produced diary-based weekly minutes 'summary records' derived from diaries completed by homemakers residing in 15 states, with the largest numbers coming from New York, California and Michigan States.

Although no diary records or 'supplementary information' (household questionnaires) have been discovered, work to locate them in Experiment Station and land-grant university archives is underway. On the basis of our supposition that the 566 records discussed here are drawn from the 808 reported by the USDA (1944), it is possible that 242 'summary records' are missing (further discussion in our Methods section below).

College women

Only 77 (of possibly 692) records from this 1930-31 'College Women' study have been located so far. Although there are fewer records for the College women than their rural counterparts, they include: comprehensive seven-day own-words diaries completed by each of the 77 respondents; 'supplementary information' questionnaires providing detailed information on household composition and characteristics, appliances and equipment, paid and unpaid help and some open-ended questions on enjoyment (of homemaking) and suggestions for improvement of the study; and researcher-produced 'summary sheets' similar to those for the farm and non-farm women.

Reconstructing the rural sample characteristics using US Federal Census data

We matched 93% of the names and addresses of the 566 researcher-prepared rural summary records (farm and non-farm rural households) to records accessed via 'Ancestry.com'. The primary information source was US Federal Census micro-data from 1920 to 1940 (possible because of the relatively short 70-year embargo in the US, as compared with 100 years in the UK and elsewhere). Additional sources used if the census data were not available included: Birth, Death & Marriage Indexes; Voting Registers (mainly Californian); Social Security Numbers; City Directories; Military records (including drafts); Immigration & travel documents (passport applications, etc.); and other material (obituaries, newspaper articles, photographs, etc.).

Census enumeration sheets group together information about all the occupants in a household at a particular address in an uninterrupted sequence starting with the (usually male)

'household head'. So identification of diarists with entries in particular census sheets enables us to establish and record household and family characteristics³ (such as sex, age and filial relationships, if any, of all household members, including co-resident relatives, lodgers and employees); spouses' and diarists' occupations (transcribed as recorded by Census enumerators). We also recorded other non-census information on year of death (several diarists lived to over 100).

No direct evidence about the USDA's general methods of sample selection, or of the particular process of selection of 566 week diaries in the surviving sample, has as yet come to light. So, we have chosen to interpret the materials straightforwardly, as Kneeland suggests in her 1929 article, simply as a representative sample of US rural women.

To date, we have identified (from the 566 diaries) 904 Census matches for 528 diaries; 7 from 1910, 390 from 1920, 404 from 1930 and 7 from 1940. All of the 528 successfully matched diarists have information for at least one of the 1920 or 1930 Censuses. For our analysis here, we have relied mainly on information from the available Census closest to the diary date. Since the majority of the diaries were collected in 1928, we have used mainly the 1930 Census materials, calculating the diarist's and other household members' ages by subtraction. To simplify the task of household reconstruction, we assumed that no deaths or separations occurred between the diary date and the subsequent Census. In the case of 1924 diaries, we identified household members born after 1920 from the 1930 Census wherever this was available. These methods enabled us to identify an under-representation of women aged 20-29 and 50-59 in the 528 cases, so we reweighted the sample to approximately reproduce the 1920s rural women's age distributions while maintaining the same overall sample size (Appendix Table A2).

The 1910 to 1940 Census data provide two separate clues as to whether the diarist is or is not in a farm household. Each Census records, in one form or another, whether or not the diarist's household is located in a farm residence. This this does not however provide conclusive evidence, since non-farm households live on farms and farm households sometimes live in towns. The occupations recorded in the Census also give some sort of clue. But over the period 1920-1930 households both moved in to farming and (more frequently) out of farming occupations. If we use the 'live on a farm' criterion in the Census closest to the diary date, we find 33% non-farm and 67% farm locations (Appendix Table A4). Alternatively, we might use a combination of 1920 and 1930 Census occupational definitions. We take a farming-type occupation in just one Census return as making the diarist's husband 'possibly a farmer' at the time of the diary, (38%), in two as 'probably a farmer' (36%) and in neither, 'not a farmer' 27%. Cross tabulation of these variables gives us at least 110 identifiably non-farm households and a little more than 300 probable farm households.

Fortunately we do not have to come to a precise view of exactly which diarists fit into which categories. Simply, the range of between one quarter and one third non-farm diarists in our

³ US Federal Census enumeration sheets included the following fields: *address* (name of the street, avenue, or road; house number); *occupant* (name of each person and their relationship to head of family); *residence* (whether home is owned or rented; value of home; whether home is farm residence; whether home has a radio); *personal* (sex, race, age, marital status, college attendance, ability to read and write, birthplace, and birthplace of parents); *citizenship* (language spoken before coming to the United States; year of immigration; whether naturalized or alien; ability to speak English); *occupation* (trade or profession; industry or business working in; class of worker; whether worked the previous day; line number of unemployment schedule); and *military* (whether veteran or not; war or expedition participated in).

recovered sample corresponds reasonably well to the 31% of non-farm diarists in the original USDA rural women's sample, which we therefore conclude is the source of the rediscovered records.

The diary results we have recovered also provide some internal evidence suggestive of what may have happened to the missing 242 summary records. The summary records were painstakingly calculated by USDA or Experiment Station researchers, who first coded the diarists' own words descriptions of their activities into the 58 categories and then summed the hours and minutes in each category, to produce the individual time budgets.

Completing any form of continuous time diary is onerous and the 7 consecutive days of recording required by the USDA is particularly demanding. On the basis of experience with other time use surveys, we would have expected approximately one third of the diaries to have some substantial amount – perhaps 30 minutes out of the 1440 minutes of the day – of unclassified, unclassifiable or otherwise missing time. In our reconstruction' however, only 6 of the 528 census-matched cases have 30 or more minutes of missing time (Appendix Table, A3) and we suspect that some at least some of these 6 cases are the results of our own transcription errors.

We also have some direct evidence from the more complete College Women's records, in the form of carbon copies of letters from Kneeland to diarists, thanking them for their participation but remarking (rather sternly) that their diaries have been excluded from the study because of missing data. (A considerable number of the rejected College Women's diaries are stored in the National Archives, but unaware of their significance at this early stage in our research, we neglected to count or record them.) Our tentative conclusion is that the surviving 566 summary records represent only the perfect or near-perfect seven-day records selected from the original 808 responses.

Comparator studies from the AHTUS

In what follows, we compare the 528 census-matched 7-day time-budgets (i.e. derived from 3696 sample days) with two sets of later materials drawn from the American Heritage Time Use Study (AHTUS). We do not draw on the 1965 materials used for this purpose by Vanek (1974). The original 1965-66 'Robinson-Converse' material (drawn from Alexander Szalai's UNESCO-funded multinational comparative study) used by Vanek comes, as she herself notes, from a study of urban households with at least one member in paid employment); the parallel 1965 US national time diary study includes only 249 days of data from rural women aged 18-65 (Appendix Table A2). However the 1975 University of Michigan time diary study provides 982 rural women's days, which just about reaches the minimum size of sample usually required for this sort of comparison (Harvey, 1993, p.204) and the modern American Time Use Study provides 6939 rural women's days over the period 2003 to 2011.

4. RESULTS

Changes in means of time devoted to work

The two panels of Figure 1 report 1925-2011 changes in mean times devoted by rural women to eight categories of paid or unpaid work, together with 95% confidence intervals calculated from simple standard errors. The changes that emerge are sufficiently large that statistical

significance can be read off directly from the standard errors in all cases where there are any substantial trends.

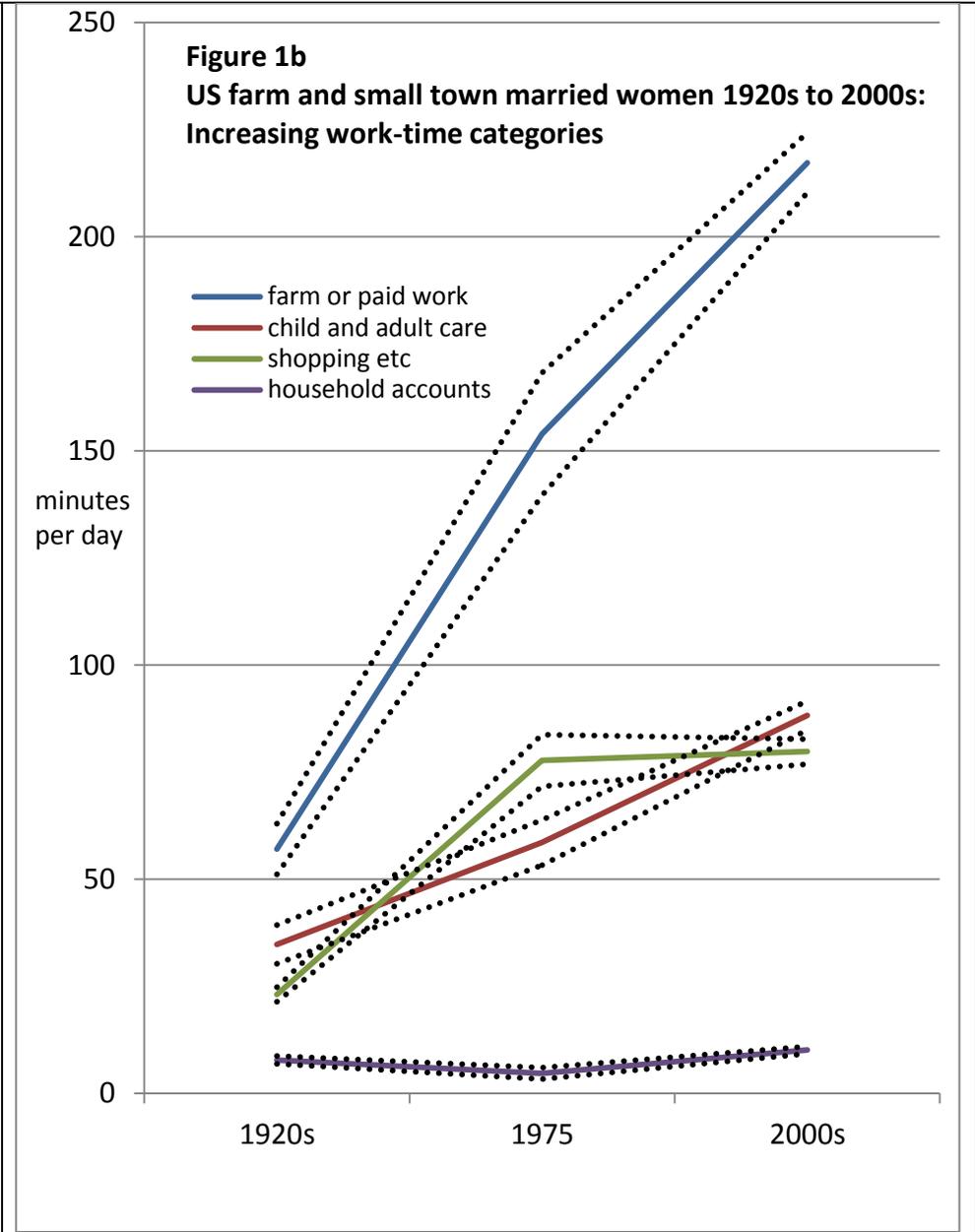
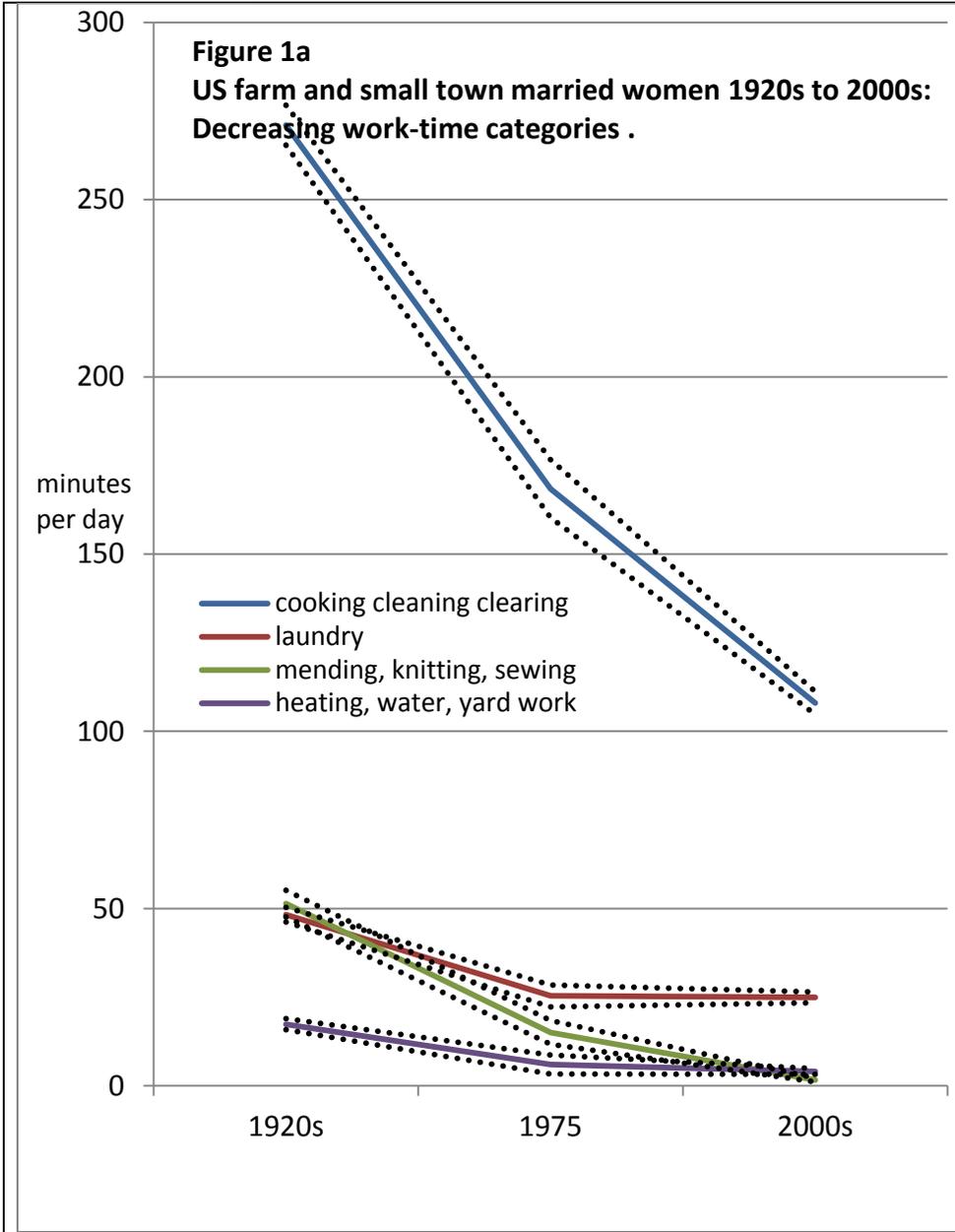
The two panels of Figure 1 show, respectively, the four work-related activity categories that have increased over the period, and the four activities that have decreased, for the entire reweighted rural women's sample.

First, and most dramatically, we see the decline in time devoted to cooking, clearing and general household cleaning. The 1920s sample had a mean of 271 minutes per day (95% confidence interval +/- 6 minutes). By 1975 this had fallen by nearly one-and-three-quarter hours to 168 minutes (+/- 9 minutes) and by the 2000s, it had fallen a further hour per day to 108 minutes (+/- 3 minutes); a clear, monotonic, unambiguously significant decline in a core domestic task. Laundry time was nearly halved, from 48 minutes/day (+/- 2 minutes) in the 1920s, to 25 minutes (+/- 3 minutes) in 1975 – again a clearly significant decline – but then no change (again 25 minutes, +/- 1 minute) in the 2000s.

Other aspects of clothing or textile care (mending, knitting and sewing) again show a significant monotonic trend over the 85-year period, falling from 51 minutes (+/- 4 minutes) in the 1920s, to 15 minutes (+/- 3 minutes) in 1975 and to 2 minutes per day (+/- 1 minute) in the 2000s. This self-provisioning activity, which loomed so large at the beginning of the last century, has now virtually disappeared. Similarly, time devoted to the provision of basic utilities such as heating, water and waste disposal, fell from 17 minutes per day (+/- 2 minutes) in the 1920s to 6 minutes per day (+/- 3 minutes) in 1975 and again, though less unambiguously significantly, to 4 minutes (+/- 1 minute) in the 2000s.

We have at present no direct measures of levels of access to domestic equipment for the 1920s rural sample (although we are still searching for the original supplementary records that collected this information, and we already have this information for the 1931 college sample). But it would seem perverse not to make straightforward ecological inferences. We have substantial aggregate-level information about low levels of availability of domestic equipment in rural homes prior to the electrification programmes of the 1930s. And we can assume that domestic standards of cleanliness and comfort, and the calorific quantities of home nutrition have, at the least, *not fallen* over the period covered by our data.

On this basis (and holding to one side the issue of labour market participation discussed in the next subsection of the paper) we take the view that, in each of the four cases, these historical changes reflect various sorts of 'labour saving' technology. In the case of household cleaning, the historical change reflects the spread of electric vacuum cleaners and similar equipment, combined with improved space-heating methods which produce less dust, and more easily maintained floor and other surface coverings (vinyl, wall-to-wall carpeting and hard synthetic laminates). For cooking, the changes reflect more efficient stoves and improvements in food storage (first canning, ice coolers, and gas or electric refrigerators and freezers) combined with the growth in availability of semi-manufactured food products (reference). Laundry work was reduced by the spread of, at first electric, then automated washing machines combined with easy-care fabrics (although the levelling-off of change post 1975, presumably reflects a growing tendency for daily replacement of soiled clothing). Making and mending has now been almost entirely supplanted by manufactured, easily-replaceable 'off-the-peg' retail clothing.



Child and adult care time (second panel of Figure 1) by contrast has increased, again quite dramatically, from 35 minutes per day (+/- 4 minutes) in the 1920s, to 59 minutes (+/- 5 minutes) in 1975, and again to 88 minutes (+/- 4 minutes) in the 2000s. The reasons for this phenomenon, well substantiated for the more recent period, but revealed here also for the earlier, are widely discussed in the literature (e.g. Bianchi *et al* 2000). Two distinct reasons for this growth are advanced in the case of childcare. First, declining completed family size: smaller families may have led to “put all your eggs in one basket, and then watch that basket” Mark-Twain-type overprotectiveness. Second, a growing pressure for extra parental time investment in children's social and cultural capital, exerted by the growth of meritocratic selection into privileged educational institutions, and experienced disproportionately by middle class households (Sayer *et al* 2004). Public health and medical changes leading to increased longevity also tend to increase adults' time devoted to elder-care.

And finally – this is particularly apparent to diary researchers who are able to look at the detailed record of simultaneous activities and ‘multitasking’ – the abovementioned processes of domestic mechanisation and automation may lead to the *unmasking* of household caring activities that might previously have been hidden by the simultaneous cooking cleaning or laundry task (e.g. “scrubbing clothes while watching children playing”).

Rural women's time devoted to household management does not seem to have changed substantially; around 8 minutes per day in the 1920s and 10 minutes in the 2000s. Shopping and associated travel time, however, increased remarkably over the first part of the period, from 23 minutes per day (+/-2 minutes in the 1920s, to 78 minutes (+/- 6) minutes in 1975. Subsequently, the trend levelled off, to just 80 (+/- 3) minutes in the 2000s. Part of the growth over the initial part of the period can be explained simply as a volume effect, an enormous growth in the range and quantity of consumption of retail goods, coupled with the previously noted decline in self-provisioning.

But perhaps just as important is a techno-organisational change in the process of shopping that happened in the US between the first two survey periods (and happened in Europe 10 to 20 years later). In the 1920s, aside from the self-provisioning natural to farm households, small items might be purchased from relatively local fully serviced stores, with storekeepers selecting goods, often with associated delivery services, while other specialised or larger items would be purchased from catalogues. But by the mid-1970s, much more of the shopping would have been carried out from self-service ‘supermarket’ stores, which require shoppers to locate and select items themselves and then queue to pay for them – consequently increasing their time in the store. And the larger the supermarket, the longer on average the journey to it, and the walk from the parking lot to the store, again increasing the time taken by each shopping event.

And the eighth category, work in the farm or the general labour market, was of some importance to the rural women of the 1920s, with a mean of just less than one hour per day (57 minutes, +/- 6). But for the equivalent group in 1975, the mean of paid work was more than two-and-a-half times higher (154 minutes +/- 14) and by the 2000s had reached 217 minutes per day (+/-7). The two later comparator surveys, with no specific focus on agriculture, may well classify some unpaid farm work elsewhere in the activity coding scheme, so the real means of paid work time for 1975 and the 2000s may in fact be a little higher than these estimates. Broadly, we see a four-fold increase in market-related work over this period.

The dramatic increase in the means of market work time represents the rapidly increasing degree of penetration of women into the paid workforce. In what follows, we adopt a minimal definition of paid labour force inclusion of just one hour or more per day. Based on this highly inclusive criterion, 35% of the rural women in our sample had a substantial part-time or full-time job (or substantial unpaid farm work) in the 1920s, 50% in 1975, and 66% in the 2000s (with a further 10% having between 4 and 7 hours weekly paid work). This shift, from slightly more than one third of women in employment to fully two-thirds, has an obvious potential relationship to time devoted to the various sorts of work. Are these simple plots of means of time in activity misleading us about historical processes? Do the historical changes discussed so far disappear once we control for changes in labour force participation?

The influence of labour force participation

The two panels of Figure 2 show the eight work-related activity categories, but now plotted separately for rural women placed, according to our 7 hours per week definition, respectively inside and outside the labour force.

The simple constraint of time availability means that, at each of our three points in history, the non-employed devoted more time to each of the seven categories of unpaid work than their employed counterparts. But aside from the absolute levels, the historical trends for women in the two employment categories are closely similar. We cannot, however, rest the analysis at this point. Both the (falling) capital costs and the (improving) performance characteristics of the various sorts of domestic equipment mean that otherwise similarly-placed women making decisions about whether or not to take paid work might have made different decisions at the successive time points. And co-incident changes in family-size decisions (again partially reflecting changes in reproductive technology), and in public sentiments about gender roles, may have parallel effects on women's labour market decisions.

In short, the changing processes of selection between the two employment categories mean that the historical comparisons may still be misleading. We cannot remedy this completely, but we can go some way towards this with the information that is now available

Modelling unpaid work time 1925 – 2011

To control for the influences of these selection processes, to the fullest extent that this is possible, we need, *first* to model the influences of the various demographic and other characteristics which influence time-use patterns, and *then* to reconsider the historical trends, holding those characteristics as far as possible constant by considering various representative instantiations of the models.

We use fairly standard Ordinary Least Squares models of the sort used, for example, by Bianchi et al 2000 (Table 2 p210). Our model estimates age and period effects, but has no higher education measure (very few of the 1927 women had any). We use more comprehensive information on numbers and ages of children, and more interactions between these characteristics and the survey period, to allow for the possibility of historical changes in the relationship of the effects of particular family statuses (ages of youngest children) on time in various activities. The R^2 statistic of .18 for the 'all unpaid work' model is just slightly higher than the equivalent .16 score in Bianchi et al result, reflecting the longer time period covered in our paper.

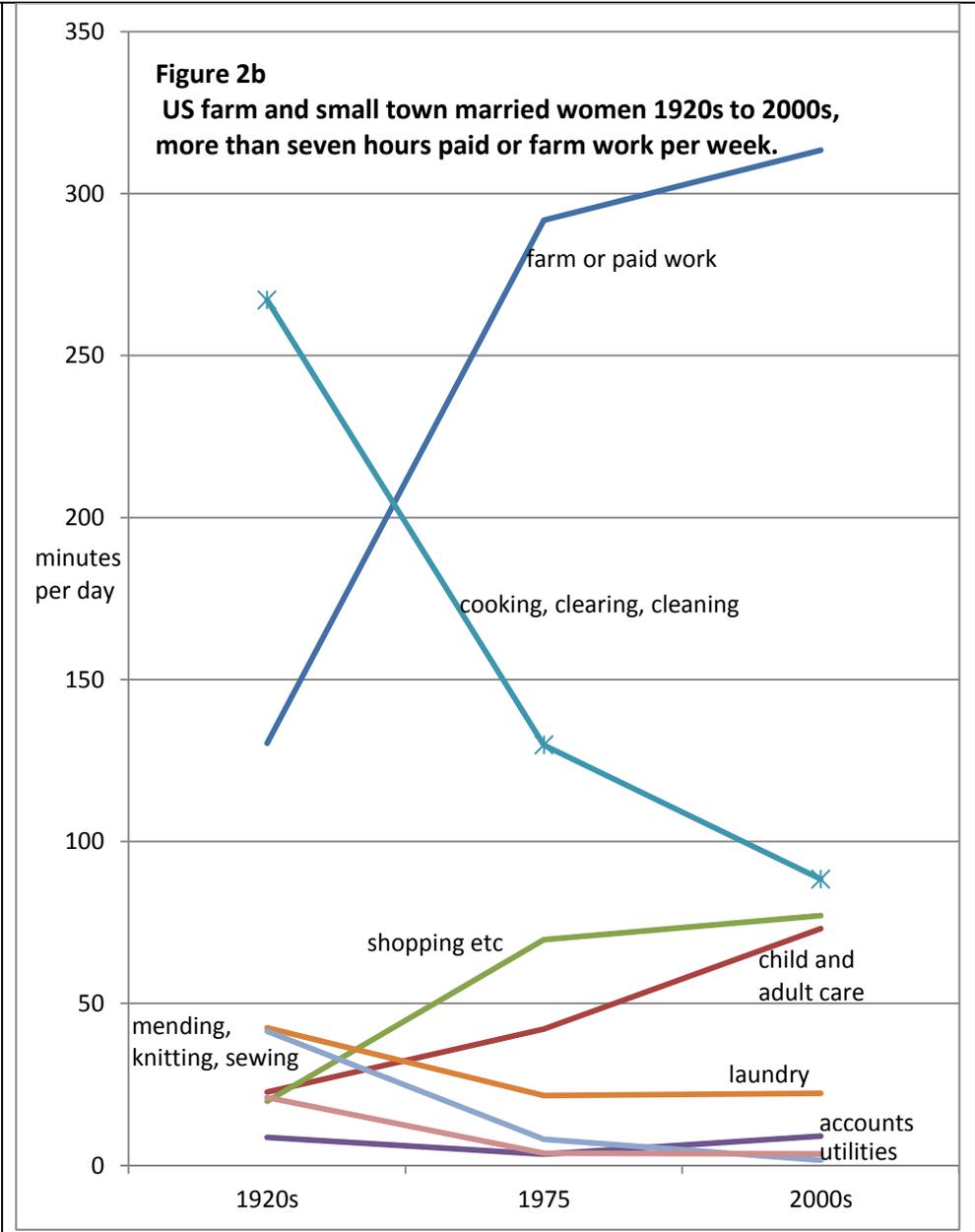
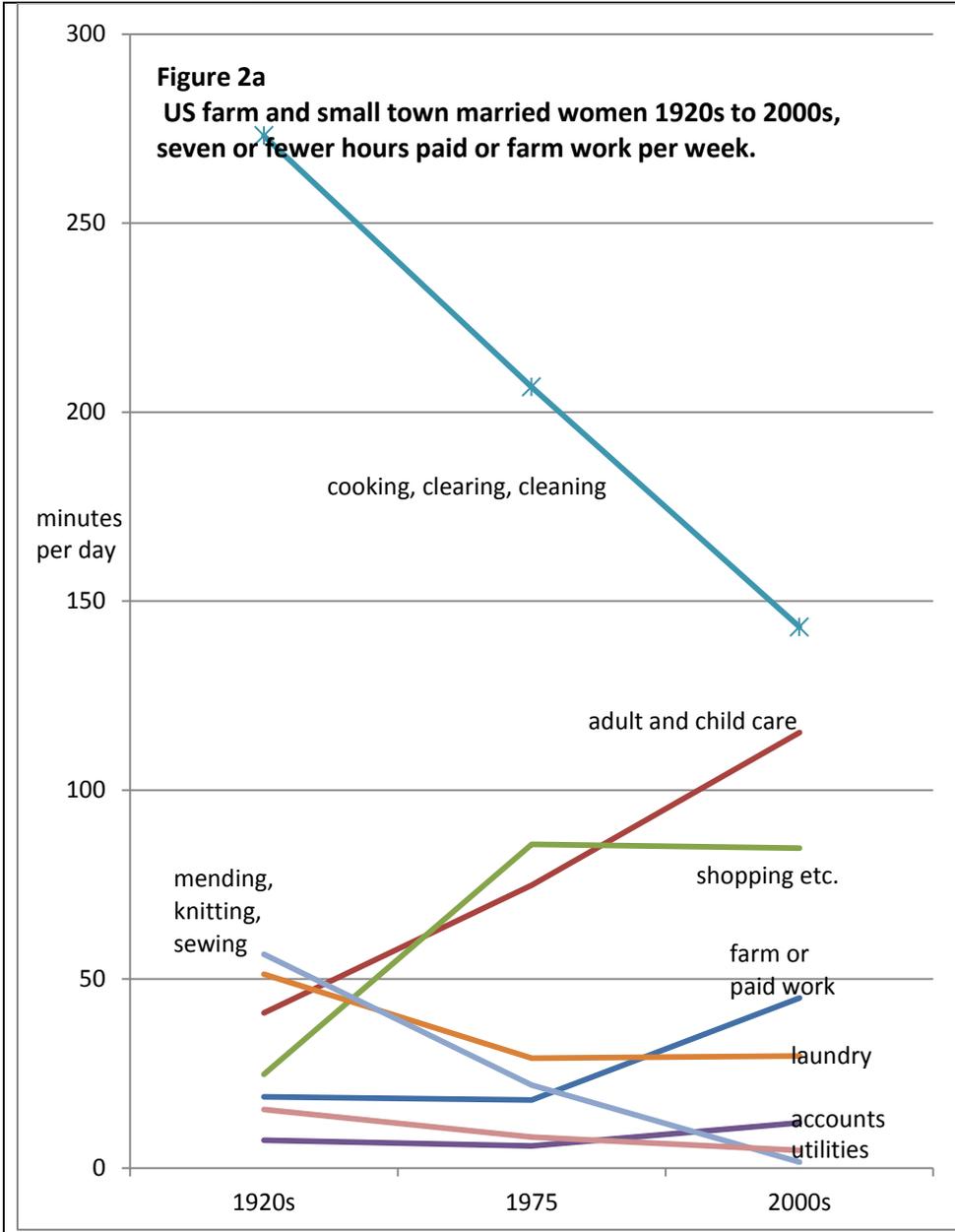
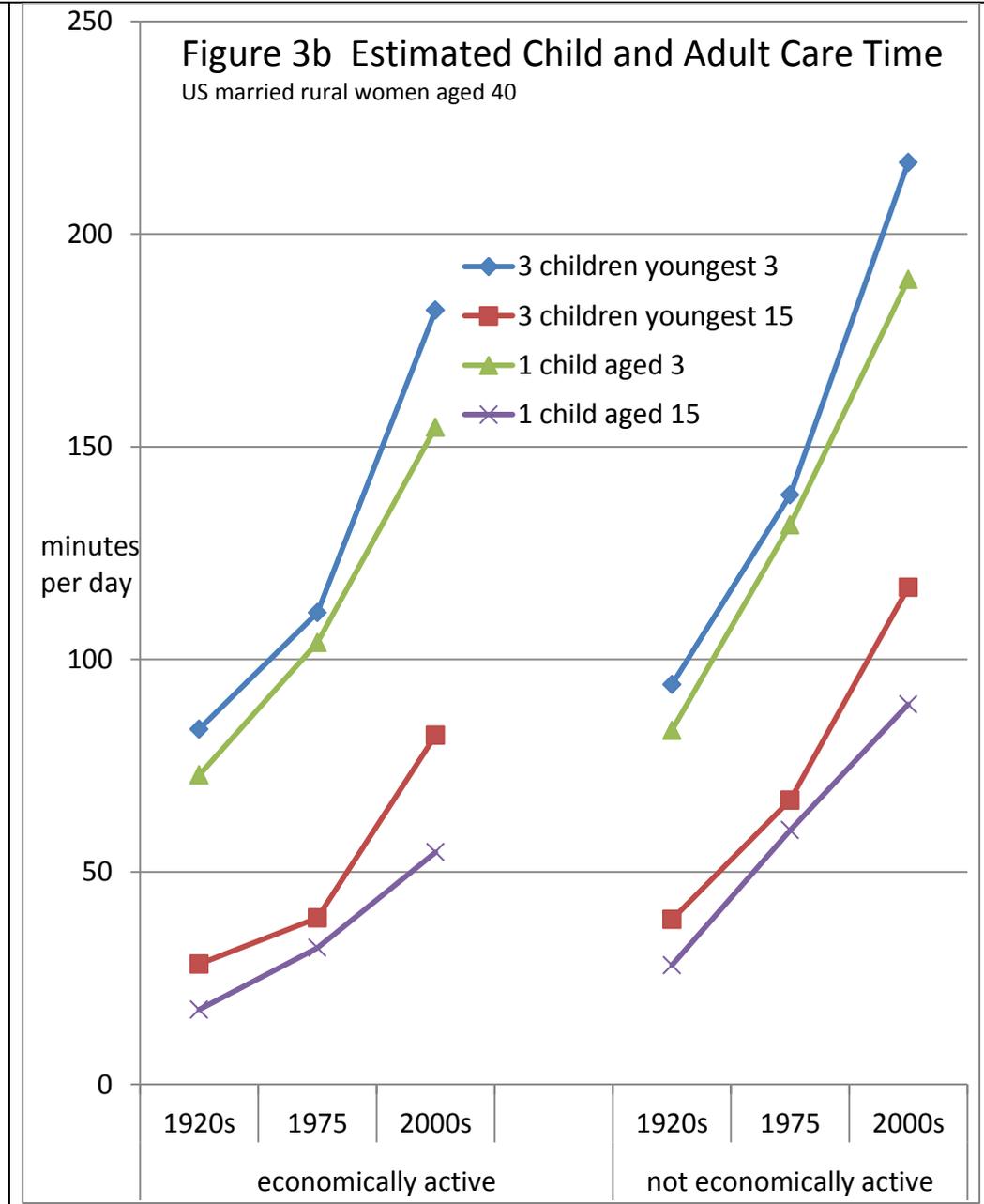
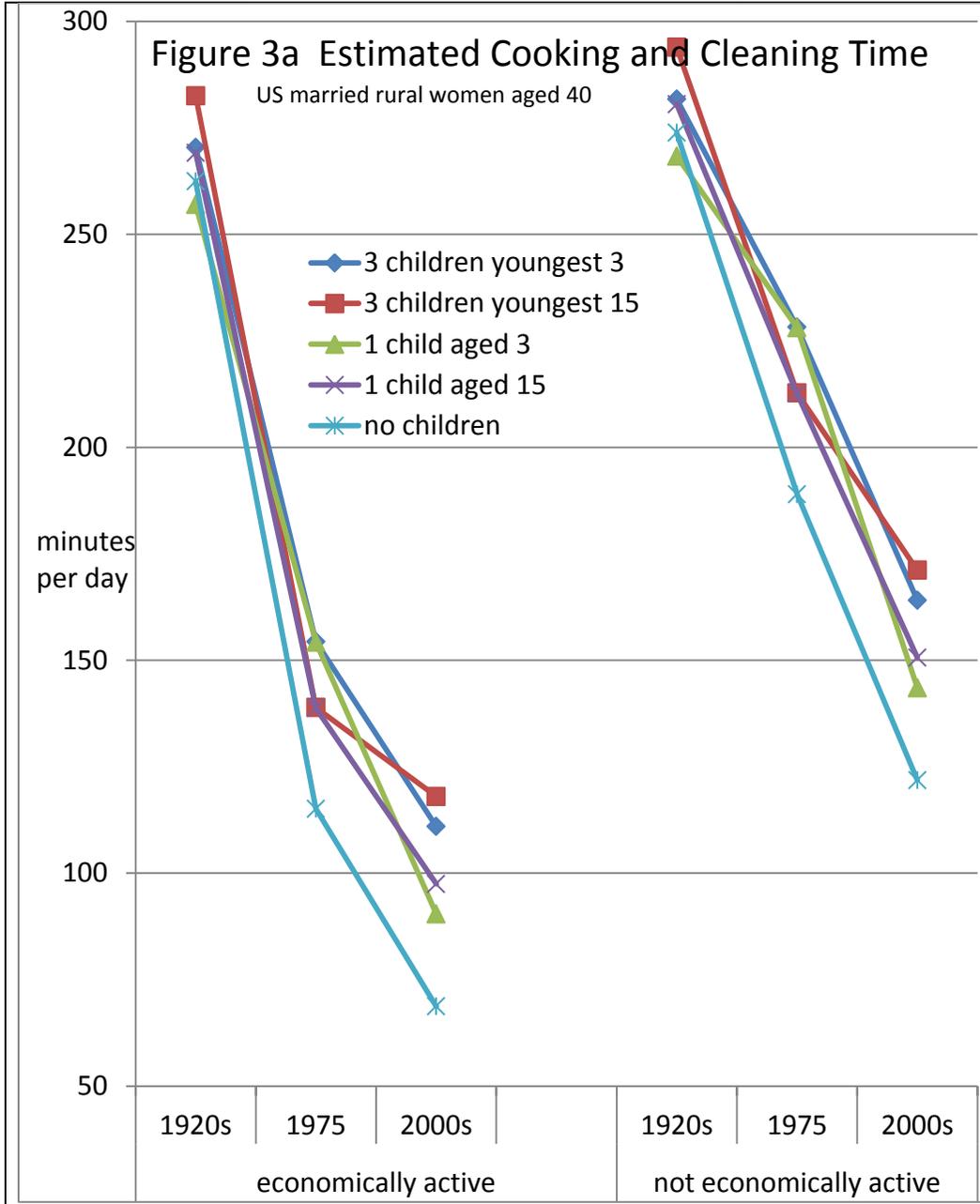


Table 1 OLS models of minutes per day in rural married women's unpaid work
(whole table reproduced as Appendix Table A5) p= .0005 *** p=.005 ** p=.05 *

	cooking	other domestic	clothes care	shop, admin	care of persons	all unpaid
Multiple R	0.46	0.31	0.34	0.16	0.50	0.42
(age, age squared, N of children, age youngest child, interactions (Table A1)
economically active	-2.3	-9.1	-28.4 ***	-3.8	-10.5	-54.1 **
economically active 1975	-29.0 ***	-33.4 **	7.0	-15.8	-17.2	-88.6 ***
economically active 2003-11	-14.0 *	-27.7 **	21.6 ***	-8.0	-24.3 *	-52.5 **
Surveyed in 1975	-40.7 ***	-44.2 ***	-65.1 ***	69.8 ***	24.6 *	-55.6 **
Surveyed in 2003-11	-77.3 ***	-74.7 ***	-83.5 ***	76.8 ***	36.5 *	-122.2 ***
(Constant)	96.2 ***	126.3 ***	87.5 ***	25.7	-18.7	317.1 ***

Table 1 gives an abstract from the full regression results (which are provided *in extenso* in the Appendix). It shows the crucial historical change and period*employment status coefficients for five sorts of unpaid domestic work, as well as the overall model for all unpaid work. (Note – a pleasing and useful characteristic of OLS – that the regression coefficients of the sub-categories sum precisely to the ‘all unpaid’ coefficients). Controlling for virtually all of the heterogeneity that our combined datasets currently allow, we see, from the increasingly negative coefficients of the surveyed in 1975 and 2003-11) that cooking, other domestic (cleaning and clearing) and clothes care (laundry, sewing and knitting) time show monotonic declines, while ‘shopping and household administration’ and ‘care of children and adults’ exhibit monotonic increases. Sum these carefully controlled component coefficients to get the overall historical change stripped of the effects of all the other measured compositional changes, and we find a one hour reduction in all unpaid work from the 1920s to 1975, and a *further* hour's reduction from 1975 to the 2000s. Essentially, this is an unchanged headline story from that derived from the historical comparisons of means in the previous two subsections.

Digging a little deeper, however, the story becomes just a little more complicated. Note the somewhat non-monotonic behaviour of the period*employment interaction coefficients. For example, considered on its own, it might appear that nearly half of the reduction in cooking time for employed women between the 1920s and 1975 was reabsorbed into cooking between 1975 and the 2000s. But of course, in order to understand what is really happening over this period, we need to consider some more comprehensive instantiations of the regression models.



The left-hand panel of Figure 3 shows a representative set of full instantiations of the cooking and cleaning models. We take in each case women aged 40 (the model specification excludes age*period interactions because of problems of multi-collinearity with family status*period interactions). We look separately at 'economically active' and 'inactive' women (using our one hour per day criterion), and five distinct family situations (at least by supposition) with increasing levels of burden; from women in households with no children, to women in households with three children of whom the youngest is aged below 3 years.

The instantiations produce clear and understandable cross-sectional differences and regular, monotonic historical trends. For each historical period and family status, those women out of the labour market do more cooking and cleaning than those in employment. (It appears also that the difference made by employment is much larger in the latest period than in the earliest – but this may reflect a change in the unobserved differences within the categories, of a sort that we shall discuss in a moment.) We see, at least in the earliest and latest cases, that three older children are associated with more cooking and cleaning than are three younger children. And we see that in general women in smaller households with no children devote the least time to these activities. But most importantly, we see an entirely consistent historical trend; time devoted to these core household activities reduces dramatically overall through the 85-year period and over both the earlier and later historical periods.

The consistent cross-sectional differences and historical trends are found also in the right-hand panel instantiation of the child and adult care trends Figure 3. Again, point for point, the non-employed women spend more time than the employed do, by a margin that increases regularly, both generally over time and in absolutely strict inverse ratio to what (we may presume to be), the level of burden imposed by the family status. Figure 3, together with Table 2, demonstrate that, throughout the 85 year period, non-employed women with the least burdensome family responsibilities spend substantially less time in childcare than non-employed women with the most family responsibilities *and* show a much larger *margin* of time in childcare over employed women with equivalent levels of responsibility. By contrast, those non-employed with the highest levels of family responsibility have the most childcare time *and* show substantially the smallest *margin* of difference when compared to equivalently-placed employed women.

TABLE 2 Change in family care time by family status

	PANEL 1 _____			PANEL 2 _____			
	non-employed/employed ratio			Change in minutes of care time/day			
	1920s	1975	2000s	employed 1920s- 1975	1975- 2000s	non-employed 1920s- 1975	1975- 2000s
3 children youngest 3	1.13	1.25	1.19	27	71	45	78
1 child aged 3	1.14	1.27	1.22	31	51	48	58
3 children youngest 15	1.37	1.71	1.42	11	43	28	50
1 child aged 15	1.59	1.86	1.64	15	23	32	30

The two panels of Figure 3 are representative of the historical trends of the four decreasing unpaid work activity categories (cooking, cleaning, laundry, sewing and utilities respectively) of the left panel of Figure and the three increasing unpaid work activities (childcare, shopping and domestic management) of the right panel of Figure 1. Over historical time, these two opposing patterns of change in time allocation, in effect, race against each other to produce the model-based estimated trends of unpaid work totals for women in the same 10 employment and family circumstances, as shown in Figure 4.

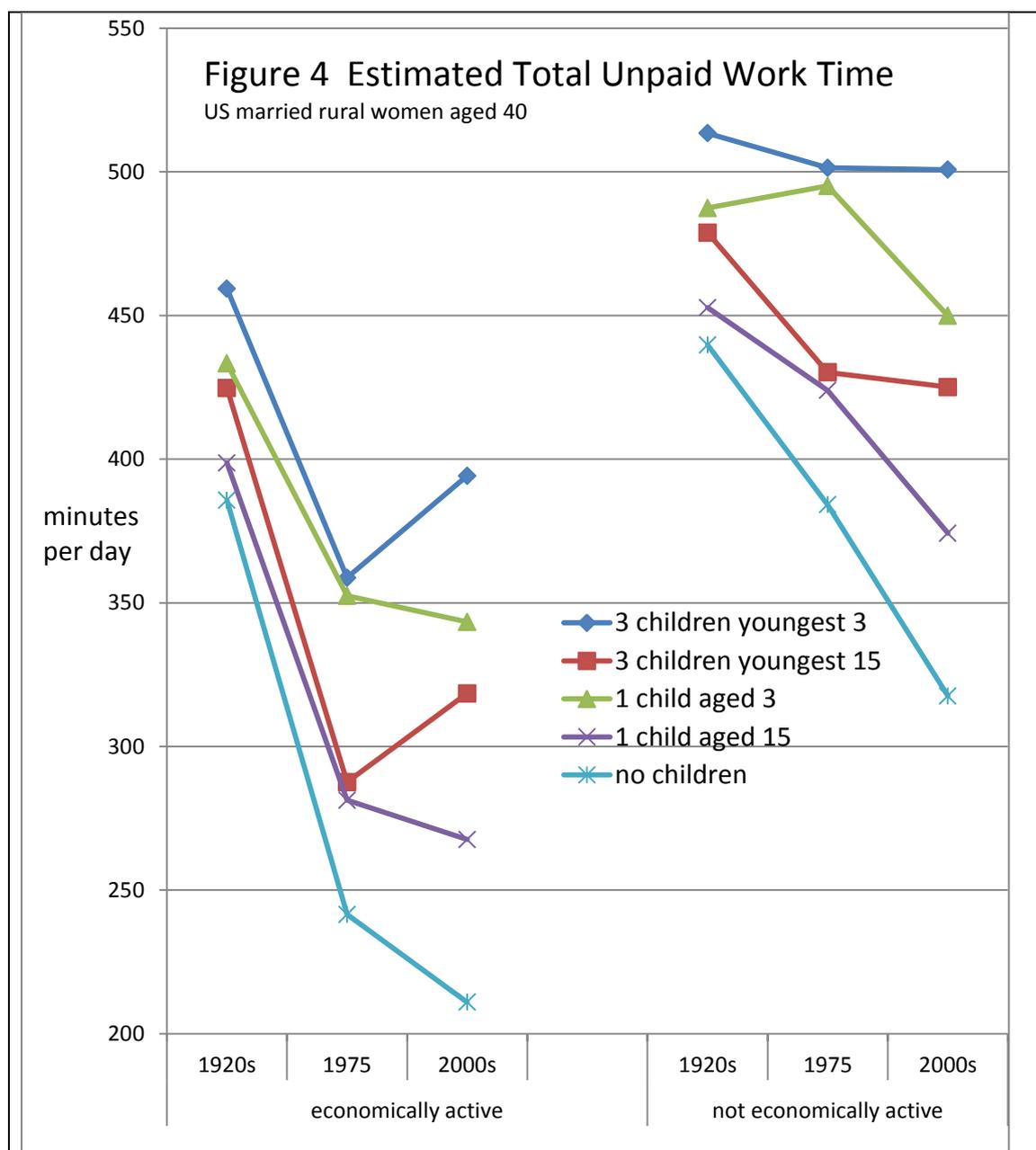
Consider first the non-employed women. All five groups of women, having controlled for heterogeneity to the fullest extent possible given our current knowledge of the circumstances of the sample members, show some reduction in unpaid work time over the 85-year period. Those with no or relatively small family responsibilities show the largest reductions. But the larger the family and, more particularly, the younger the children are, the smaller the historical reduction in unpaid work time. Why?

This reflects arithmetically the accelerating historical trend in the marginal effects of family responsibilities as shown in Panel 2 of Table 2 (for example, the *27 minute increase* for employed women with three children under three between the 1920s and 1975, *becomes a 71 minute increase* between 1975 and the 2000s). This acceleration (which corresponds to the increasing gradients in the Figure 3b 'caring' plots) is seen in seven of the eight comparisons in this panel – the single exception being the non-employed women with children aged 15.

Behind this arithmetic lies a selection effect. Over both of the periods, women in each of the family size and age-of-youngest-child categories became progressively more likely to enter the paid labour force. A mother with three children including (at least) one toddler, was more likely to have at least a part time job in 1975 than in 1925, and in 2005 than in 1975. To the extent that labour force participation reflects family burdens, we can presume that those women with three children including *two* toddlers (not controlled for in the model), are less likely to enter the labour than those with only one.

So this is the selection effect: non-employed women's family responsibilities *within* each of the measured categories become heavier over time, in ways which are not measured (or at least, not included in the model). And by the same argument, the mean level of family responsibilities becomes heavier for each category of employed women as well, since, for example, some of those women with two toddlers who would not have been in employment in 1975, would be more likely to consider employment in the 2005.

Similar considerations apply to each of the categories of non-market work. To the extent that women are still responsible for a larger proportion of unpaid work than their partners, the larger the household or the home, the more dependent children or elders, the more extensive the weekly shop, and so on, the larger the consequences of the 'unobserved' historical change effects on the various sorts of women. The consequences of selection are smallest for women with no children (who live on average in smaller houses and with smaller numbers of co-residents). So in Figure 4, the women, in and out of employment, with no children, show the clearest effects of household automation (since other sources of variation are most effectively controlled-for). Those women with three children, including a toddler, who remain non-employed in the 2000s, have on average much heavier domestic burdens than this group had in the 1920s. A case of unobserved (or at least uncontrolled-for) heterogeneity!



Change in behavioural propensities versus compositional effects

Finally, we can turn to consider formally the question of whether the substantial historical trends discussed in this section reflect changes in the makeup of the households (family size, children's ages, women's labour-market engagement, etc.) or changes in the behaviour associated with particular household characteristics (effects of new social norms, of the diffusion of new equipment, materials and technical infrastructure). To do so, we deploy the straightforward Oaxaca Decomposition technique suggested for just this purpose in Bianchi *et al.* (2000).

This technique relies on the observation that the sources of historical change in the value of a dependent variable between two time points that are explained by a set of independent variables can be broken down into four components:

$$\begin{aligned} &\text{historical change in means of time in an activity} \\ &= \text{intercept change effects} + \text{coefficient change effects} \\ &\quad + \text{means change effects} + \text{interaction change effects} \end{aligned}$$

With n independent variables in an OLS regression:

$$\begin{aligned} \text{change in means of time in activity} &= \bar{Y}_{t=1}^i - \bar{Y}_{t=0}^i \\ \text{intercept effects} &= \text{int}_{t=1}^i - \text{int}_{t=0}^i \\ \text{coefficient effects} &= \sum_{i=1}^n (\bar{X}_{t=0}^i * (b_{t=1}^i - b_{t=0}^i)) \\ \text{mean effects} &= \sum_{i=1}^n (b_{t=0}^i * (\bar{X}_{t=1}^i - \bar{X}_{t=0}^i)) \\ \text{interaction effects} &= \sum_{i=1}^n ((b_{t=1}^i - b_{t=0}^i) * (\bar{X}_{t=1}^i - \bar{X}_{t=0}^i)) \end{aligned}$$

...where change is estimated from $t=0$ to $t=1$. Intercepts plus coefficients together constitute what Bianchi *et al.* (2000, p. 211) call “behavioral propensities” and interaction effects are that part of the overall variance explained as the joint product of coefficient changes and changes in the means of the independent variables.

We base our estimation on a version of the cross-time OLS regressions excerpted in Table 1 and set out *in extenso* in Table A5, but now, in effect, fully saturated with interactions between the historical period and the other independent variable – in the form of separate regressions for each period. These 18 individual regressions are set out in Table A7, while the means of the independent variables, together with an example of the Oaxaca calculations, in Table A6.

Table 3
Proportion of all historical change in time use related to behavioural propensities

	1920s-1975	1975-2000s	1920s-2000s
cooking	90%	94%	95%
other domestic	120%	83%	173%
clothes care	96%	97%	99%
shopping	110%	129%	105%
child & adult care	139%	111%	129%

It emerges that the great majority of all the change over this extended period is explained neither by changes in the size and composition of families, nor by women's increasing levels of commitment to paid work, but straightforwardly by changes in behaviour. We can arrive at this interpretation reasonably un-problematically, since in every case less than 10% of all the explained variation in the time-use categories is associated with interaction (and hence unattributable – the fact of generally small positive interaction coefficients meaning that the behavioural proportions are slightly underestimated.) And indeed the proportions in excess of 100% imply that the compositional effects would, had there been no compensating behavioural shifts, have led to historical trends in the opposite direction.

5. DISCUSSION

What is the nature of these behavioral shifts? In straightforward contradiction of the claims made by Vanek, Cowan, Mokyr, and less directly Bittman *et al.*, and many others, we do not find any evidence of simple normative shifts towards higher standards of housing, superficial

cleanliness or hygiene leading to more unpaid work. On the contrary, the straightforward downwards shift in women's time devoted to cooking, cleaning, laundry and other housework – first identified in cross-time comparisons of micro-level diary survey data (for the US and the UK) by Gershuny and Robinson (1987), and substantiated over the longer-term for the US by Bianchi *et al.* (2000, 2012) – now emerges as fully consistent with our much longer-term evidence for the US. We have nevertheless no doubt (although we present no evidence) that US norms have indeed shifted in the direction proposed by Vanek and her successors; simply, 'labour saving' materials and equipment, together with associated infrastructural improvements, have increased domestic labour productivity at a rate that exceeds the evident growth in the quantity and value of domestic services produced by housework, laundry and so on.

Household work trends in the broader sense, however, tell a quite different story. Childcare time, all are agreed, has grown consistently through this period, which must relate at a general level to changes in norms. We advance two main explanations: 'positional competition', encouraging parents to devote ever more time to enhancing aspects of their children's human capital so as to improve their future earnings and social status; and growing protectiveness with respect to environmental threats, perhaps related to smaller completed family sizes. There may however also be a contribution as an indirect consequence of technological change. The previously-mentioned reduction in housework may in effect reveal childcare activities that were previously masked as secondary accompaniments to activities described primarily as cooking, cleaning or laundry. Some careful reanalysis of the complete primary plus secondary diary records in the American Heritage Time Use Study is called for here.

The increased volume of purchases (more money to be spent, less self-provisioning for food and clothing) is part of the explanation for the rising historical trend in shopping. Also, until recently, retailers' pursued economies of scale and reduce service provision through ever-larger warehouse-type self-service outlets, which in effect export much of the transport and service work previously associated with sales occupations into the unpaid work of consumers.

What, however, will be the effects of newly emerging internet-based sales and home delivery services on shopping time? We must wait on future time diary data collection to answer this question.

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APPENDICES**Appendix Table A1. 58 activity categories in the USDA diary studies**

unpaid work			personal care and leisure			farm and paid work		
1	V1111	Preparing breakfast	1	V2101	Night sleep	1	V1201	Gardening, fruit growing
2	V1112	Preparing dinner	2	V2102	Day sleep	2	V1202	Poultry
3	V1113	Preparing supper or lunch	3	V2201	Eat breakfast	3	V1203	Dairy work
4	V1114	Other preparing	4	V2202	Eat Dinner	4	V1204	Livestock
5	V1121	Clearing breakfast	5	V2203	Eat supper or lunch	5	V1205	Field crops
6	V1122	Clearing dinner	6	V2204	Other eating	6	V1206	Farm management
7	V1123	Clearing supper or lunch	7	V2305	Care of person	7	V1207	Other farm work
8	V1124	Other clearing	8	V2306	Other care of self	8	V1208	Farm work travel
9	V1125	Other food	9	V2307	Care travel	9	V1209	Other work
10	V1131	Cleaning and straightening	10	V3001	Reading			
11	V1132	Care of fires	11	V3002	Meetings and study			
12	V1133	Care of water supply	12	V3005	Listening over radio			
13	V1134	Making, repairing, installing	13	V3006	Informal social life			
14	V1135	Care of house surroundings	14	V3007	Social affairs, entertaining			
15	V1136	Other house	15	V3008	Outings, sport			
16	V1141	Regular washing	16	V3009	Other leisure			
17	V1142	Regular ironing	17	V3010	Leisure travel			
18	V1143	Extra laundering	18	V4100	Other			
19	V1144	Laundry sent out						
20	V1151	Mending						
21	V1152	Sewing and fancy work						
22	V1153	Other clothing and textiles						
23	V1161	Care of household members						
24	V1171	Food purchasing						
25	V1172	Other purchasing						
26	V1173	Planning and recording						
27	V1174	Other management						
28	V1180	OTHER HOME MAKING						
29	V1199	household travel						
30	V3003	Work for organisations						
31	V3004	Care non hh members						

pendix Table A2: Weighting the USDA diary sample by age

Age Group	USDA unweighted		USDA weighted		AHTUS rural women			2003-	
	n	%	n	%	1965	1975	1985	-	Total
16-19	3	0.6	21	4.0	2	2.9	0.8	0.7	75
20-29	70	13.3	137	26.0	26.9	27.4	19.9	16.7	1292
30-39	203	38.5	127	24.0	24.9	21.9	27.2	25.8	1755
40-49	162	30.7	116	22.0	20.9	16.8	22.2	26	1711
50-59	67	12.7	106	20.0	21.7	20.8	23.4	22.2	1512
60-65	22	4.2	21	4.0	3.6	10.3	6.5	8.7	59
	1	Missing							
Total	528	100	528	100	249	982	261	5331	6939

Appendix Table A3. Small amounts of missing data

	1428-42 min (N=510)	1410-45 min (N=522)	all (N=528)
FARMWORK	50.5	50.4	50.1
PAIDWORK	7.1	7.6	7.5
SLEEPING	538.9	538.2	538.8
EATING	76.8	76.9	76.9
SELFCARE	52.7	52.7	52.6
READING	63.0	63.4	63.3
RADIO	11.6	11.8	12.0
OTHMEDIA	0.0	0.0	0.0
VOLNMEET	45.1	45.2	45.0
OUTNSPRT	34.1	33.9	33.7
OTHRLEIS	124.2	123.4	123.7
COOKING	121.9	121.9	121.8
CLEARING	68.4	68.2	68.0
CLEANING	63.8	64.0	63.9
FIXUTILS	17.7	17.7	17.7
LAUNDRY	47.8	48.0	47.9
MENDSEW	51.0	51.5	51.3
CHIADCAR	34.4	34.3	34.3
SHOPTRAV	23.2	23.1	23.0
MANAGEMENT	8.0	8.0	8.0
TOT2	1440.0	1439.8	1439.3

Table A6 Oaxaca decomposition of cooking time 1920s-75, 1975-'00s and 1920s to 2000s

minutes change due to:	change in minutes/day			percentage change		
	1928-1975	1975-2003	1928-2003	1928-1975	1975-2003	1928-2003
<i>intercept differences</i>	-87.1	-6.3	-93.4			
<i>coefficient differences</i>	46.0	-26.2	17.4			
Propensity differences	-41.2	-32.5	-76.0	90%	94%	95%
means differences	-0.4	-3.0	-1.3	1%	9%	2%
interaction differences	-4.3	1.0	-3.1	9%	-3%	4%
total change	-45.9	-34.4	-80.3			
		-80.3		100%	100%	100%
	cooking regression coefficients			means		
	1928	1975	2003	1928	1975	2003
Multiple R	0.23	0.32	0.21			
diarist age	0.40	1.84	0.52	38.51	40.10	42.18
diarist age squared/100	-0.55	-1.32	0.02	1625.90	1790.02	1921.79
n of children in household	6.44	4.22	5.92	1.39	1.28	1.18
no child (def.)						
youngest child 0-3	-22.56	19.61	5.38	0.23	0.23	0.22
youngest child 4-7	-9.33	9.69	1.44	0.18	0.10	0.14
youngest child 8-11	-5.01	3.51	1.24	0.12	0.10	0.12
youngest child 12-17	-2.89	15.19	3.25	0.13	0.16	0.14
not economically active (def.)						
economically active	-0.54	-30.70	-16.20	0.34	0.50	0.65
(Constant)	114.81	27.67	21.39			

Appendix Table A7 Regression coefficients by period

	cooking			other domestic		
	1928	1975	2003	1928	1975	2003
Multiple R	0.23	0.32	0.21	0.11	0.23	0.20
diarist age	0.40	1.84	0.52	0.12	0.50	1.23
diarist age squared/100	-0.55	-1.32	0.02	0.23	-0.11	-1.12
n of children in household no child (def.)	6.44 ***	4.22 *	5.92 ***	0.34	-4.50	4.34 *
youngest child 0-3	-22.56 ***	19.61 *	5.38	2.47	26.74 *	5.74
youngest child 4-7	-9.33	9.69	1.44	0.96	37.96 *	15.11 *
youngest child 8-11	-5.01	3.51	1.24	-1.40	17.51	4.18
youngest child 12-17	-2.89	15.19 *	3.25	-0.86	3.04	8.58
not economically active (def.)						
economically active	-0.54	-30.70 ***	-16.20 ***	-8.64 *	-42.11 ***	-37.00 ***
(Constant)	114.81 ***	27.67	21.39 *	42.86 ***	88.31 *	48.80 *
	clothes care			shopping		
	1928	1975	2003	1928	1975	2003
Multiple R	0.26	0.19	0.12	0.26	0.16	0.07
diarist age	-1.20	0.14	1.30 *	2.47 ***	4.81 *	-0.60
diarist age squared/100	1.43	0.49	-1.12	-3.12 ***	-6.65 *	0.67
n children in household no child (def.)	1.97	0.35	2.60 *	-1.07	-2.36	-0.99
youngest child 0-3	-13.27	9.51	-4.87	0.13	-26.68 *	-13.68
youngest child 4-7	-3.45	3.06	-4.44	0.98	-19.80	-13.86
youngest child 8-11	0.74	23.29 *	-5.87	4.33	-27.48 *	-1.22
youngest child 12-17	-4.21	11.58	6.24 *	8.26 *	-12.36	-4.75
not economically active (def.)						
economically active	-26.39 ***	-20.73 ***	-7.10 ***	-4.92 **	-22.11 **	-10.96 **
(Constant)	133.06 ***	29.12	-4.30	-12.16	35.31	116.45 ***
	child & adult care			all unpaid work		
	1928	1975	2003	1928	1975	2003
Multiple R	0.59 *	0.47 *	0.49 *	0.40	0.45	0.38
diarist age	-2.99	3.44	2.45	-1.20	10.74 **	4.90 *
diarist age squared/100	2.81	-4.14	-2.71	0.80	-11.72 ***	-4.27 *
n children in household no child (def.)	5.98 **	2.87	13.57 ***	13.65 ***	0.58	25.44 ***
youngest child 0-3	46.44 ***	80.61 ***	119.70 ***	13.22	109.79 ***	112.27 ***
youngest child 4-7	12.37	33.35 **	59.29 ***	1.53	64.26 *	57.54 ***
youngest child 8-11	-5.28	26.30 *	27.24 ***	-6.61	43.13	25.56 *
youngest child 12-17	-1.15	-4.65	6.04	-0.84	12.80	19.36
not economically active (def.)						
economically active	-6.05	-28.10 ***	-34.66 ***	-46.54 ***	-143.75 ***	-105.91 ***
(Constant)	86.05 ***	-18.58	3.71	464.62 ***	161.83 *	186.04 ***