

Second Shift Meets Market: An Evaluation of Household Labor's Price in Germany

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- Preliminary Results -

Abstract

We examine the distribution and value of time spent on unpaid labor across different household types and income groups. As an underlying data source, the German Socio-Economic Panel (GSOEP) is used to assess the value of household production from 1992-2017. We find that household production generates substantial values in low-income households while generally high-income households spent less time on household production tasks.

Keywords: Time Use, Gender Differences, Labor Division, Economics of the Household

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1 Introduction

Despite the normalization of women in the labor force and increasing workplace equality (Goldin, 2014), women are still not equal at home. Time use surveys across Europe repeatedly find an unequal division of household tasks such as cleaning, cooking, repairs, and childcare between men and women. In addition to their labor force participation, women find themselves burdened with a second shift of work at home or reduce the amount of time spent on the labor market to meet household production needs. Consequences are higher levels of stress and reduced levels of well-being as household work takes up time meant for rest (Bird, 1999) as well as lifetime income losses.

Unpaid labor, especially with regards to home production, is acknowledged as an important source of value in economics. For example, the Swiss Statistical Office regularly publishes statistics estimating the value of household labor with a replacement cost-approach and relating it to GDP (für Statistik, 2021). Including replacement cost measures of household production in addition to income metrics leads to a reduction in inequality measures as low income households engage in higher levels of home production compared to high income households (Frazis and Stewart, 2011). It is therefore important to better understand households allocation of care work and the resulting unequal burden at the expense of women.

This is why this study examines the composition and development of the value of unpaid labor performed at home by both men and women between 1992 and 2017. We find that home production generates substantial values over the course of a year and that this value is equivalent to at least a part-time job for women.

2 Literature Review

There is no question in the literature regarding the different involvement of men and women in household production. Within Europe, the unequal division of household labor between men and women begins at co-habitation and becomes progressively more unequal as children enter the household (Aassve et al., 2014). Three mechanisms are used to explain the household labor division between men and women. A consideration of external (e.g. employer-driven) time constraints suggests that the household member with lower working hours takes on a larger role in household production (Becker, 1965). Income disparities and outside earning power matter in the household bargaining process, suggesting that individuals who earn more or contribute more heavily to the total household income have to do less housework (Aassve et al., 2014). Furthermore, traditional gender roles may still play a part in the initial allocation of housework (Coltrane, 2000).

The time argument suggests that women take on more household work than men, because they (especially following the arrival of children) are more likely to work in part-time employment. As their working day is shorter, the additional time capacities are then dedicated towards home production. In Germany, the high incidence of women in part-time work is well-documented, with the difficulties of securing sufficient child care being one of the primary reasons for women to reduce their labor supply or not participating in the labor force all together. Bujard and Panova (2016) show that following child birth, traditional gender roles reemerge even in partnerships that previously exhibited egalitarian work distributions. This is especially pronounced while children are below the age of five; during this phase women are often pressed for time and report lower levels of emotional well-being. Bauernschuster and Schlotter (2015) demonstrated that in Germany the provision of public child care positively affected maternal labor supply as it helped decrease the burden of care work women previously had to manage.

Income disparities and part-time work often coincide, which makes the separation of effects more difficult as these variables are endogenous with respect to one another. Economic theory predicts that household production between partners will be allocated in accordance to their relative earning power, as outside options influence their bargaining position (Browning and Chiappori, 1998; Apps and Rees, 1997). Gwozdz and Sousa-Poza (2010) use a structural model to show that changes in the wage composition are consistent with women’s decreased hours spent on household activities for the German Time Use Survey in 1992/1993 and 2002/2003. Using the German Socioeconomic Survey (GSOEP), Procher et al. (2018) find that as income increases (both in terms of individual shares of household income as well as in absolute terms) the amount of housework is expected to decrease for men and women alike. With data from the Danish Household Survey, Amuedo-Dorantes et al. (2010) show that the extent to which couples pool their incomes is sensitive to the price of the market household services (proxied by the price of female unskilled labor). They suggest that the primary earner pools their income with the secondary earner as a way of compensating for the household production the secondary earner engages in.

In addition to the economic reasons that may entice a division of labor between men and women, gender norms continue to play a role. The societal norm that housework falls into a women’s realm may shape expectations regarding household responsibilities of each gender. Multiple studies also found that if a couple deviates from standard gender norms, i.e. by having a female primary earner, women will on average increase the amount of housework performed, contrary to what household bargaining predicts (Bittman et al., 2003; Procher et al., 2018). This behavior of ”performing gender” of women is likened to compensation for not conforming to the gender norm of having a male primary breadwinner within the household and is associated with lower divorce rates in both the United States and Germany (Cooke, 2006).

Schwarz (2016) uses the German Time Use Survey to provide an estimate of the aggregate value of unpaid household labor via a replacement cost approach. Using a generalist wage as reference and additionally accounting for the cost of hypothetical vacation days and health insurance contributions he finds that the total value added by household labor in Germany in 2013 was equivalent to approximately 40% of GDP. While the focus of his research laid on macroeconomic sizes and the importance of household labor for national accounts, we complement his work by looking at specialist wages and the value of work for households themselves.

Because the mechanisms are interlinked and often coincide, it is particularly hard to disentangle the individual effects. However, the literature agrees that the pattern of unequally distributed household labor can be found in a majority of Western countries and that the burden of housework continues to rest largely on women (Aassve et al., 2014). Even when women subvert gender expectations and act as the primary earner, there is a tendency to compensate for this deviation by a traditional gender role division in term of housework.

3 Time Use in Germany

3.1 Time Use Data

This study uses data from the German Socioeconomic Panel (GSOEP) due to the regularity of time use collection and the detailed socio-demographic information it contains. The time use variables are collected retroactively, surveyed individuals are asked about their average time spent during the weekday or weekend on specific types of activities. For our analysis we chose to focus on

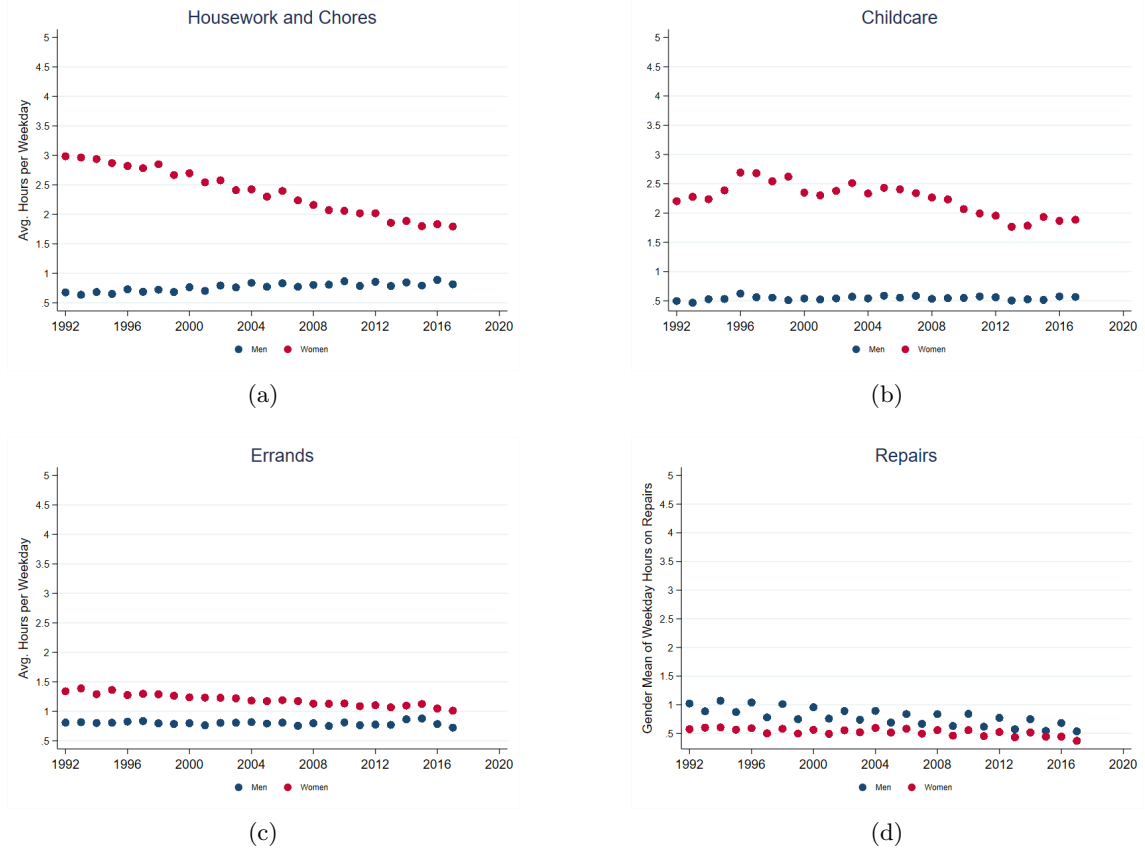
care activities that would have a market equivalent and do not consider other time use variables. The variables we use are time spend on housework and chores, childcare, running errands, and repairs. Within the GSOEP survey, information on time use for care work is collected for weekdays, Saturdays, and Sundays. Time use information for weekdays was collected on an annual basis, while weekend time use was collected in a bi-annual rhythm.

Because the wording of the question and auxiliary variables changed slightly as the survey developed, we restrict our time period to 1992-2017 to maintain consistency. The sample considers all individuals between 18 and 65, and we exclude the refugee sample. In addition, we consider information on the household type (living with partner and/or kids), education levels, generational effects (by birthyear), household income, and individual labor income.

3.2 Time Use Patterns and Development

Figure 1 shows the development of the average weekday hours spend on unpaid labor activities by gender. As in line with previous observations in the literature and the results from the more detailed German Time Use data, there is a significant and persistent gap in the average amounts of unpaid labor between men and women (Gwozdz and Sousa-Poza, 2010). We refer to this gap as the care gap. The data also indicates that there is a gender gap with regards to the type of tasks being performed by either gender. Women allocate more time to housework, childcare, and running errands, while men spend more time on repair work than women do. We see that time use of either gender appears to be linked to tasks that are stereotypically associated with that gender: women are responsible for domestic tasks such as housework, cleaning, and childcare while men tend to be more involved in occasional repair work.

Figure 1: Average Weekday Hours Spent on Unpaid Labor



The time span of the data also allows us to trace how the care gap has evolved over time. We

find that the gap has shrunk overall and that this reduction is driven by women reducing their supply of unpaid labor by a greater amount than men increased it over the same time period (see Figure 1), findings that are mirrored in the German Time Use Surveys from the same period. We find that this pattern continues to hold for the weekends, even though data is only collected in a bi-annual rhythm. On Saturdays, we observe mild increases in the amount of time spent on housework and repairs, with men almost doubling the time spent on repairs. As repairs can usually be postponed to a later time and men are more likely to hold a full-time job, the increase of weekend activity is plausible. This increased effort over the weekend is not sufficient to close the overall hours gap to women. Most notably, there are no significant mean-level differences between genders regarding time spent on running errands over the weekend (and given that most stores in Germany are closed or have limited operating hours on Sunday, the constant mean at 0 over time is expected).

We proceed to calculate an aggregate measure of tasks spent on household activities by adding the individual components together for each survey year. While the descriptive statistics by simple means point to the existence of a gender gap, we conduct a series of multivariate regressions to ensure that gender is the primary explanation. We estimate the time spent on unpaid labor tasks as the dependent variable and control for education, household type (using a two-person no-kid household as base), as well as the number of children.¹

The multivariate results in Table 1 confirm the pattern showcased by the descriptive statistics while the coefficient for gender is highly significant for all years. The development over time also shows that while women continue to expend more time on unpaid labor compared to men, at the intensive margin the amount has decreased. Higher shares of household income lead to lower amounts of care work all else being equal, consistent with the theory of specialization and intra-household bargaining. Higher levels of formal education are associated with less time spent on care work. Individuals who report still being in school are on average expected to perform three hours less of work, as almost all of these individuals also report living in multi-person households and are in their late teens and early twenties it's likely that the bulk of housework is taken on by other family members while they devote their time to school.

The regression results point to three key factors that explain the hours of unpaid labor: household type, kids, and employment status. The addition of (young) kids to a household causes an increase in hours, primarily due to childcare (using individuals in two-person no kid households as a reference category). A married parent² with children under the age of 16 is expected to spend two more hours per weekday on unpaid labor compared to an individual who has a partner but no kids controlling for socio-economic characteristics. Single parents spend an additional hour on unpaid labor compared to the reference group. We additionally need to account for the effect that kids in specific age ranges are expected to have on the amount of work as these households (couples with children and single parents)- have children by definition. As would be expected, we find that the younger the children are, the more additional hours of unpaid labor are performed. Once children are teenagers and more self-sufficient, the difference in work is no longer significantly different from the base category of a married couple. We even find that for households with kids above the age of 16, the work of an average adult is lower than if they were in a couple without children, although the coefficient is not significant in all years. We take these results to indicate that elder children pitch in and help reduce the household workload.

Gender is one of the strongest factors influencing expected time spent on various household activities. If we abstract from the overall hours to focus on the individual activities, we continue to find that the impact of gender on expected hours appears to not be driven by external factors such as

¹Results for the weekends are available upon request.

²For ease of reading we refer all individuals who live with their partner and report being in a committed relationship to as married because no distinction is made in terms of household type based on marital status.

Table 1: Determinants of the Amounts of Unpaid Labor

	1995	2005	2015
Female	2.536*** (23.84)	2.161*** (22.86)	1.627*** (22.63)
Household Type			
(Reference Category: (Married) Couple wo. Children)			
Single Person Household	0.783*** (4.55)	0.861*** (6.49)	0.429*** (4.18)
Single Parents	1.512*** (5.51)	1.444*** (6.11)	0.952*** (6.30)
Couple with Children < 16	1.612*** (6.53)	1.801*** (6.95)	2.148*** (9.40)
Couple with Children $\geq$ 16	-0.239* (-1.99)	-0.0456 (-0.34)	-0.165 (-1.93)
Couple with Children < & $\geq$ 16	0.567* (2.31)	1.210*** (3.63)	0.720** (3.07)
Multi-Generation Household	-0.0264 (-0.07)	-0.687 (-1.72)	0.0641 (0.16)
Other Household Types	0.958* (2.35)	-0.00760 (-0.02)	-0.382* (-2.04)
Employment Status			
(Reference Category: Full Time Employment)			
Part Time Employment	1.509*** (8.90)	1.671*** (10.14)	1.197*** (10.65)
In Education, Voc. Training	1.017*** (4.31)	0.426 (1.48)	1.049*** (6.37)
Marginally Employed	3.138*** (7.60)	3.053*** (11.13)	2.220*** (12.52)
Unemployed	3.854*** (22.03)	3.067*** (20.33)	3.132*** (22.44)
Individual (labor) share of household labor income	-1.813*** (-7.16)	-1.839*** (-9.38)	-1.111*** (-6.65)
Constant	-11.07*** (-9.02)	-3.223** (-3.03)	-7.989*** (-9.34)
Region	Yes	Yes	Yes
Education	Yes	Yes	Yes
Migration Background	Yes	Yes	Yes
Kids	Yes	Yes	Yes
Age & Age ²	Yes	Yes	Yes
Birth Cohort	Yes	Yes	Yes
Observations	9375	13568	19193
Adjusted R^2	0.514	0.471	0.439

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

education or employment. With the exception of repairs, being female is associated with between 30 minutes to an hour of additional work per weekday, controlling for known influences (see Table 2). The gender care gap is robust to various specifications: the burden of unpaid household work appears to strongly rest on women throughout all education levels and household types. This pattern is not unique to a specific social group or class.

Table 2: Time Use Components

	1995	2005	2015
Housework and Chores			
Female	1.568*** (40.17)	1.073*** (35.77)	0.707*** (30.30)
Observations	9375	13568	19193
Adjusted R^2	0.517	0.459	0.357
Childcare			
Female	1.076*** (16.58)	1.156*** (16.55)	0.924*** (18.21)
Observations	9375	13568	19193
Adjusted R^2	0.449	0.430	0.430
Errands			
Female	0.361*** (7.68)	0.223*** (10.43)	0.165*** (7.03)
Observations	9375	13568	19193
Adjusted R^2	0.449	0.430	0.430
Repairs and Yard Work			
Female	-0.468*** (-13.54)	-0.290*** (-12.46)	-0.169*** (-8.24)
Observations	9375	13568	19193
Adjusted R^2	0.143	0.131	0.079
Controls			
Household Type	Yes	Yes	Yes
Labor Force Status	Yes	Yes	Yes
Income Share	Yes	Yes	Yes
Region	Yes	Yes	Yes
Education	Yes	Yes	Yes
Migration Background	Yes	Yes	Yes
Kids	Yes	Yes	Yes
Age & Age ²	Yes	Yes	Yes
Birth Cohort	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results point to the fact that the gender, household type, and labor force status matters for the expected amount of household labor performed by an individual. Plotting the average hours spent on the four tasks we consider for the three most common household types, we see that there is strong relationship between the hours spent on unpaid labor and the type of household an individual resides in. For housework and chores, single men and women spent comparable amounts of time within 15 minutes of one another, the difference is still significant though economically negligible. Once we look at individuals in established relationships, we see that women increase the amount of time spend on housework while men reduce it. We see women in long-term relationships increasing their hours on unpaid work by around 50% compared to single women already prior to having children, in fact, children appear to reinforce this pattern (similar findings are reported for Germany by Procher et al. (2018)). Compared to a single woman, the hours spent on housework and chores are more than double for a women with children. This could be simply driven by

the fact that children are additional household members and thus demand additional time and resources from their family. But while we observe these increases for women as households get bigger, we see the reverse for men who do less on average in a multi-person household compared to when they were living alone. Once living with a partner (and children), the average man will reduce their work while the average women will compensate for it.

When it comes to childcare Figure 2 shows the time expended on an average weekday. Between gender norms and that men are more likely to work in full-time employment compared to women (Goldin, 2014), the finding that on average women spent significantly more time on childcare compared to men is plausible. From 1992 to 2017, men have increased the time they spent with their children by almost half an hour in a slow, but steady trend. Over the same time span, women have increased the time spent on childcare by an hour with a daily average of 7 hours, making childcare comparable to the hours of a full-time job. We also see the reassuring result in the data that both singles and individuals who live together with their partner but have no own children spend an average of near 0 hours on childcare.

Turning to errands, we again see that the average single man and single woman spend similar amounts of time running errands. The difference between the two is slightly less than 8 minutes in 1992 and is statistically significant. Over all years the difference always remains less than 15 minutes; We argue that over the course of a week this is economically negligible. As was the case for housework, once the individuals start co-habiting (with or without kids), men report less time than women spent on running errands. Though the magnitude of the time gap has shrunk over time: in 1992 the average gap still amounted to 26 minutes for couples without children, by 2017 it was halved to 13 minutes. However, Figure 2, panels (c) and (d), point out that the shrinking of the gap is not caused by men and women meeting in the middle, but by women reducing their time. The trends for men and women who have children under the age of 16 mirror the patterns of couples without children. On average, a woman with children under the age of 16 will spend 41 more minutes per day running errands compared to a man with children under the age of 16. Over the course of a week, this stacks up to a difference of about 3.5 hours caused by errands alone.

Repairs are the only task where women are expected to spend less time on than men. Single women spend less than half an hour an average weekday on repairs, compared to men who spend around half an hour. For both genders, these values stay approximately constant over time. Once we turn to co-habiting individuals, men increase their average hours to almost double the hours of single men in that year. Cohabiting women (whether with or without children) do not differ significantly from one another; they increase the average amount of time spent on repairs by about 30 minutes, the difference between the two groups being negligible. However, repairs and yard work during the weekend are increased, suggesting that over the course of the week men postpone these tasks to the weekend when they have more time available to them (Samtleben et al., 2020).

The various household types (and with it the number of family members) cause different amounts of work, as such it is highly plausible that we see greater divergences between the average hours compared to the simple male-female comparison (e.g. the hours spent on childcare also involve the hours of men and women who do not have children and thus reduce the average). The final component we wish to explore is labor force status, as the availability of time is likely a factor that will induce household to divide the labor among each other. Women with children are far more likely to work part-time compared to women without children in order to be able to attend their children's needs. Figure 4 showcases that on average individuals with lower working hours perform more unpaid labor than their full-time employed peers. The extent to which this happens varies greatly by gender again. For men, the difference of time spent on chores between the average unemployed and full-time employed male amounts to half an hour in 1992 (or 20 minutes in 2017). The difference between a full-time employed woman and an unemployed woman amounted to two full hours per weekday in 1992, or the length of an average working day over the course of a week. As was the case in Figure 1, women have generally decreased the amount of housework they complete since 1992 to a greater extent than men have increased it, regardless of labor force status.

As generally shown in the literature point out - childcare is usually taken on by the person that has lower working hours (as shown in Figure 4). Based on the averages reported, men in part-time employment do spend an average half an hour more with their children per weekday compared to those who are full-time employed. As men are generally expected to work full-time even when they have children, deviating from this norm will likely be to facilitate more involvement. Full-time employed and unemployed men only differ minimally from one another. While the differences for men between labor force statuses were modest, the picture for women showcases a clear pattern. Women and men in full-time employment spent similar amounts of time on childcare during the week. This changes once we consider women in part-time employment who spend approximately two hours more per day on childcare compared to full-time women. For women who are unemployed this is even greater, with more than four hours per day spent on childcare.

To explain this phenomenon, we make a distinction regarding employment status - unemployed refers to both women who are registered unemployed, but are actively looking for jobs and would work, as well as those who are out of the labor force. As the latter case applies to stay-at-home parents, we look at the distinction between the registered unemployed and those out of the labor force (see Figure 3). This distinction makes a significant difference for women. Women who have registered as unemployed devote significantly less time to childcare and their time use pattern is similar to those who are part-time employed. Women who are out of the labor force devote by far the most time and resources to childcare and have increased this over time. While the average stay-at-home mother spent five hours a day on childcare during the week in 1992, this number increased to more than six and a half hours by 2017. Over the span of a week, the average hours spent on childcare alone by these rival those of a full-time job.

Errands and repairs again have similar hours across all labor force statuses, between both genders the small gap that emerges appears to be driven by the amount of weekly working hours. The gender care gap for these tasks remains persistent. On average, individuals with fewer or no working hours will expend between a quarter and half of an hour more time on running errands. Regarding the overall time use patterns, housework and childcare are the biggest tasks men and women spend the most time on and where the gender care gap is most significant, considering both household and labor force status. If we add the hours of all tasks together over the course of the working week, we find that hours rival those of paid employment (compare Table 3).

Table 3: Average Hours Spent on Unpaid Labor Mo.-Fr.

	Men			Women		
	Unemployed	Part-Time	Full Time	Unemployed	Part-Time	Full Time
1995	21.50	16.27	12.75	50.99	36.65	20.38
2005	19.20	17.01	11.92	43.15	33.34	16.65
2015	19.73	21.11	13.49	45.64	34.10	17.94

4 Valuation

4.1 Replacement Cost Data

To evaluate the extent and development of household labor over time, we need to quantify its value. In the following section this is done with specialist wage replacement cost approach, following the previous literature (Frazis and Stewart, 2011; Schwarz, 2016). The market replacement cost is estimated separately by hourly wages that apply to jobs containing similar tasks. For the tasks studied, households generally have the option of either completing the work themselves or sourcing a market alternative. For the same reason, we follow Schwarz (2016) and only consider unpaid tasks that could be reasonably be outsourced to a third person. As the wage is commonly used as an expression of an individual’s productivity, we argue that it represents a reasonable approximation of the gross value generated by households.

The GSOEP contains income and detailed job and qualification information of individuals. As with the time use data, we restrict our area of focus to 1992-2017. Within this time period, we consider all individuals (excluding the refugee sample) who had a positive labor income, were active in the labor force (irregardless of full time or part time employment), provided information regarding their working hours, and for whom a job classification was available. Job information is given by the Classification of Jobs (Destatis, 1992), a Germany-specific occupational classification. The Classification of Jobs encompasses 2287 different jobs in total. For each of the five tasks, the Classification of Jobs was referenced to determine what types of jobs would face tasks comparable to unpaid household labor (e.g. house cleaners, maintenance persons, or carpenters). Individuals who fell into one of the categories were then selected into the reference pool to help estimate a wage corresponding to the tasks of unpaid household labor.

Dividing gross labor income by the contractual hours worked yields an approximate estimate of the gross hourly wage an individual commands. To get the best possible measure of job wages, we then average the hourly wages of individuals who hold the same job classification. Because the time use data is not more detailed as to what kind of tasks are performed, we average the hourly rates estimated for the jobs associated with a specific unpaid household labor task to obtain the average wage of that task. To address concerns regarding the varying qualifications of the individuals used to generate the household labor wages, we construct three additional measures. We use information on the level of job training individuals underwent for their current jobs to better approximate that professional services by highly trained individuals are likely harder to substitute by home production means. The distinction is made between low qualifications (no or informal on-the-job training), medium qualifications (a completed vocational qualification), and high qualifications (a university degree). To ensure time series consistency, the wages are then expressed in real terms with 2015 being selected as the base year in order to allow a comparison with the minimum wage that was introduced 2015.

The tasks considered are manual tasks; therefore the low incidence of university degrees (with the exception of childcare) speaks to a suitable selection of reference jobs. At the same time, the lower subsample size for higher qualifications means that the metrics for upper-bound wages need to be interpreted with more caution.

4.2 Valuation Patterns and Development

A calculation of the resulting hourly values per task show that, in 2015 terms, an hour of unpaid work generates values for the household that lie above the federal minimum wage (8.50 EUR in 2015). We take these results to show that there are significant values being generated by households although they do not factor into national statistics since these tasks are not bought or sold. Similarly, this may be a driving factor for the decision of individual household members to continue specializing in household production tasks, especially if their outside (market) options are around minimum wage or the existential minimum.

Examining the development of these wages over time (Figure 5), we find a remarkable consistency of wage levels for errands, housework, as well as repairs. Over the span of 26 years, the value of these activities has not decreased. Our results can be found in Table 4. An hour of childcare on the other hand, has appreciated in real terms. This appreciation is likely in part driven by the higher incidence of tertiary degrees we observe in later years. In 1992, 10% of the sample held a tertiary degree, by 2017 the number doubled to 21%.³ However, when we look at the evolution of the value of childcare by qualification, in 1992 the values for low, medium, and high qualifications are within 1 EUR/h of each other. Over the 26 years we study, the lower bound value for childcare increased by 2.14 EUR/h, compared to the 8.64 EUR/h increase for the upper bound (high qualification) value. While the hourly pay for those possessing advanced degrees may have increased more strongly, this trend can be observed for all qualification levels.

To arrive at the valuation of the unpaid household labor, we combine our estimates on the gross hourly replacement cost wages per activity with the time use information on each activity. Multiplying the two values results in the value generated by an individual for a specific task. As individual's time use is the underlying data source we expect the valuation to reflect the differing patterns of men and women by their household and labor force status type. In Section 3.2 we already observed that men and women barely differ in their time use patterns while still single and prior to co-habitation. As such, the values of household labor performed by single men and single women is within a 10 real EUR (base: 2015) difference of one another.⁴

From the data we know that the largest differences in time use emerge once we consider men and women in established partnerships or marriages. Again, we make the distinction between couples with children and those without. Women with children are more likely to scale back their working hours or retire from the labor force altogether in order to be more flexible when it comes to childcare arrangements (Bauernschuster and Schlotter, 2015). An increase in household production by women may arise from this as the agreed upon division of labor between parties. This argument becomes implausible when we consider couples without children, where on both partners work full-time in more than half the cases observed.

As Figure 6 depicts, on a weekday the average married women without kids performs unpaid labor

³At the same time, we also observe increasing numbers of individuals who received little to no training in their childcare jobs, though the increase of university degrees is stronger.

⁴If we consider single parents the picture changes slightly. single fathers and single men differ in approximately one hour of childcare, leading to a valuation difference of 13-16 real EUR (base: 2015). cross-tabulations indicate that single fathers are on average younger than single mothers and usually still go to school or are undergoing vocational training. We interpret the low values of childcare as a sign of other people, most likely family members, assisting fathers. Single mothers increase their hours dedicated to childcare and reflect the expected patterns.

Table 4: Average (Gross) Hourly Replacement Cost Wage by Activity

Year	Errands	Housework and Chores	Childcare	Repairs and Yard Work
1992	10.51	10.94	10.90	12.84
1993	10.68	10.95	12.19	11.82
1994	11.52	10.37	13.46	13.01
1995	11.58	10.94	13.71	13.05
1996	12.29	11.18	15.30	13.79
1997	11.99	10.51	14.96	12.35
1998	13.04	11.13	14.66	12.36
1999	12.86	12.43	15.53	12.14
2000	12.61	10.54	14.55	12.98
2001	13.02	10.58	15.00	12.81
2002	13.52	11.20	15.83	12.76
2003	13.75	11.30	15.36	13.79
2004	13.17	11.19	15.02	13.61
2005	13.32	10.62	15.75	13.37
2006	12.74	10.03	15.57	13.40
2007	12.42	11.50	15.69	12.59
2008	12.50	10.36	14.64	13.00
2009	12.63	11.38	15.90	11.97
2010	12.58	10.23	15.39	11.46
2011	11.59	9.56	14.71	11.63
2012	11.95	9.62	14.63	11.75
2013	11.62	9.69	13.90	11.19
2014	12.03	9.88	14.07	12.18
2015	13.06	9.94	14.87	12.08
2016	12.77	10.51	15.23	12.67
2017	12.51	10.12	16.45	12.38

Source: GSOEP, own calculations

Notes: Values in real EUR (2015=100)

worth approximately 1.5 times the labor of the average married man without children. The pattern is consistent over time with chores being the main driver of this difference. In 1995, the household labor of men without children was 33.39 EUR (base: 2015), while the work of women without children was worth 53.14 EUR (base: 2015) on average. Consistent with the patterns of less work being performed over time, the values of the work (and the gaps between men and women) being performed decreased by 2015. In 2015, the household labor of men without children averaged a value of 27.97 EUR (base: 2015) per day, while women generated 40.09 EUR (base: 2015) per day. Making the cross-comparison to couples that have children, Figure 6 emphasizes the large role that childcare has in the generation of value for the households. Both men and women who have children perform more household labor on average than their counterparts without children for any given year. In the case of men, the difference is modest and is equivalent to 13 EUR/weekday (base: 2015) in 1995, but grows over time, consistent with the findings that men are spending more time on childcare and that the value of childcare has substantially increased over time. By 2015, the difference between the average weekday value of household labor of men with and without children was equivalent to 30 EUR (base: 2015). For woman, this gap is more substantial with a gap of more than 100 EUR (base: 2015) between women with and without children. The difference is primarily driven by childcare and a slight increase in errands and is consistent with the time use patterns explored in Section 3.2.

The gender care gap becomes apparent considering the comparison of married men with children to married woman without children. In the early 1990s, the value of household labor being performed by married women without children exceeds the value generated by married men with children. We take the results to show that the burden of the housework generally lies with women, regardless of the familial situation. In terms of value, we do see a change in trends: as a combination of women generally reducing their amounts of household labor and men gradually increasing theirs, combined with the increasing value of childcare, by the mid 2000s men with children produced more value than women without children and continued to do so until the end of the time series in 2017.

The previous sections concentrated on the average daily value that was generated by household labor. In a final step, we extrapolate these values for a year. The GSOEP also asked for weekend time use in a bi-annual rhythm. Using the same valuations as calculated in Section 4.1, we can construct an estimated value for the amount of work performed on weekends as well. To obtain weekly estimates, we multiply the average weekday value times 5 and add the estimated values for Saturday and Sunday. The weekly estimates are then multiplied by 52.125 (the average number of weeks in a year, accounting for leap years) to obtain consistent annual estimates.

Results for the annual aggregation of the real value of household labor are in Table 5 and split by gender and employment status. For men, the values in all years are within an approximate 4,000 EUR (base: 2015) margin of one another, regardless of their employment status. In 1995, unemployed men generated more value in household production than men employed in part-time. The increases of part-time men's involvement in household production over time helped reverse this trend and led them to catching up by 2005. As was the case for the development of the hourly replacement cost estimates, we find that there is an overall remarkable consistency in the values generated over the period studied.

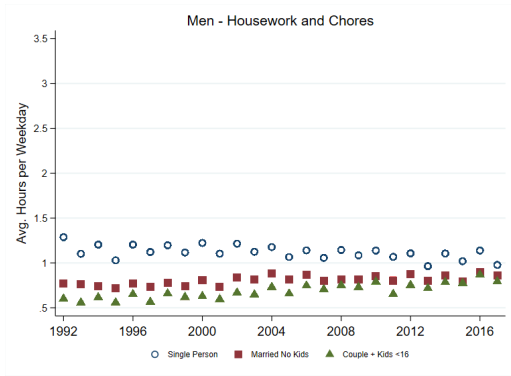
For women, the differences in time use become apparent when considering employment status. Unemployed (including both registered unemployed and women out of the labor force) women consistently account for the highest values of home production with between 40,000 and 43,000 EUR (base: 2015). These are annual values equivalent to a having a full-time job. We find a similar story for women in part-time employment, with values of home production being between 33,000 and 35,000 EUR (base: 2015), the values of home production suggest that the household work taken on by women is akin to holding a second part-time job. The women in this category are

already employed, however, the volume of work they take on in addition to their job gives rise to a second shift as they complete household work and chores or attend to their children’s needs before and after work to a greater extent than men do in any employment category. This story repeats again for women in full-time employment. While the time use statistics pointed to them engaging in less household production compared to women who do not work or only work part-time, they still generate substantial value, comparable to the value that the most productive (in terms of the value of household production) men generate on top of their full time job.

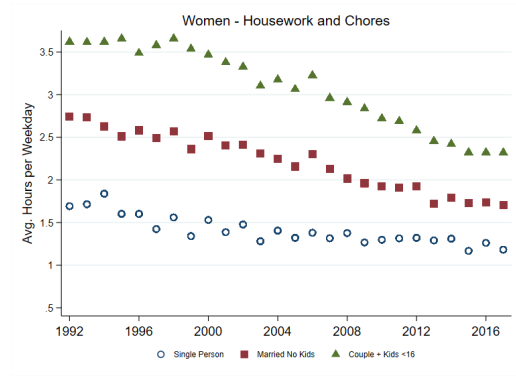
Table 5: Annual (Gross) Labor Value of Unpaid Household Labor

	Men			Women		
	Unemployed	Part-Time	Full Time	Unemployed	Part-Time	Full Time
1995	18,025.06	15,841.06	14,825.93	43,366.31	33,859.29	20,221.61
2005	17,144.75	17,597.93	15,264.22	40,850.21	33,647.70	17,638.15
2015	16,768.70	20,423.22	16,953.34	43,235.97	35,263.21	19,295.04

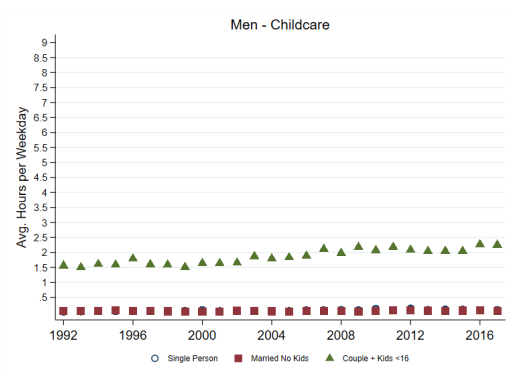
Figure 2: Average Weekday Hours Spent on Unpaid Labor by Gender and Household Type



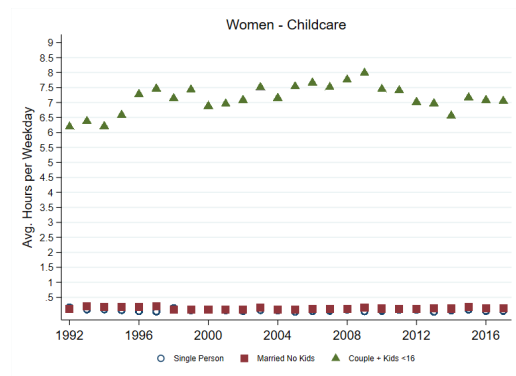
(a)



(b)



(c)



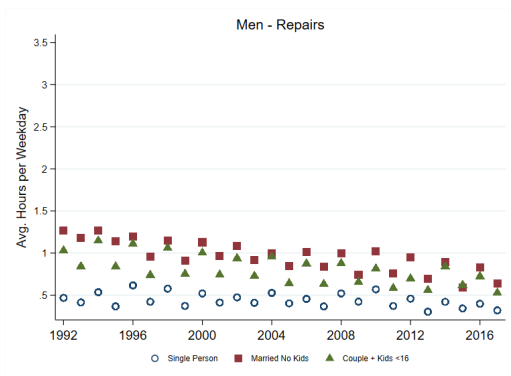
(d)



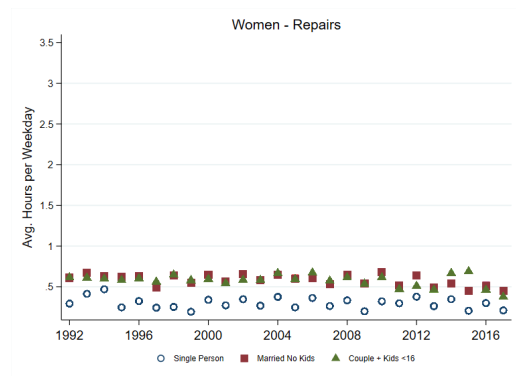
(e)



(f)

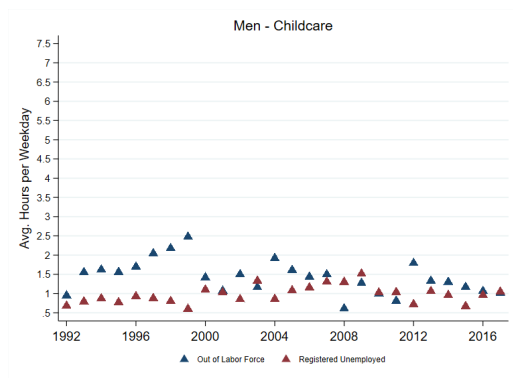


(g)

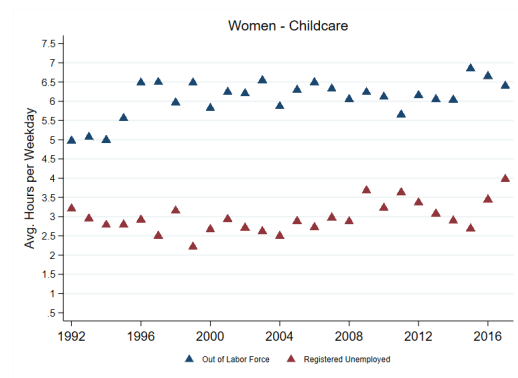


(h)

Figure 3: Average Weekday Hours Spent on Childcare: Unemployed vs. Out of Labor Force

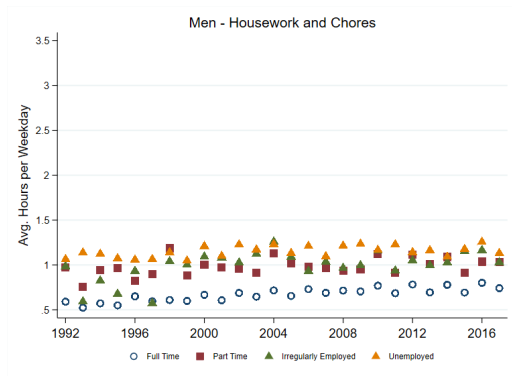


(a)

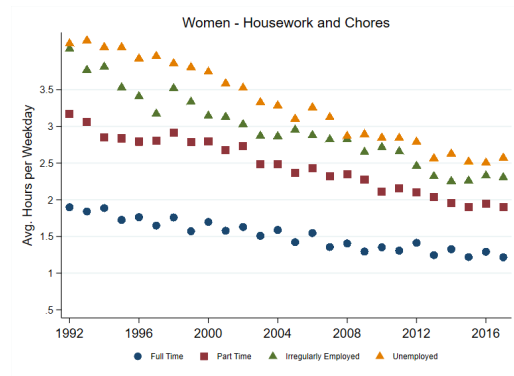


(b)

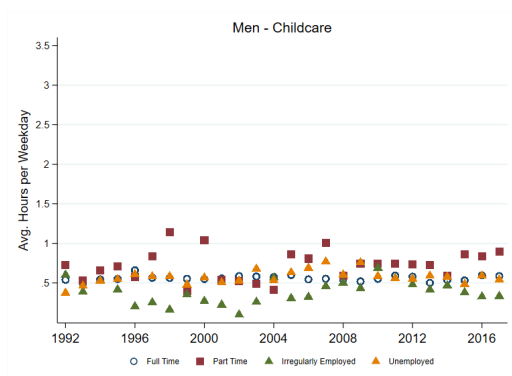
Figure 4: Average Weekday Hours Spent on Unpaid Labor by Gender and Labor Force Status



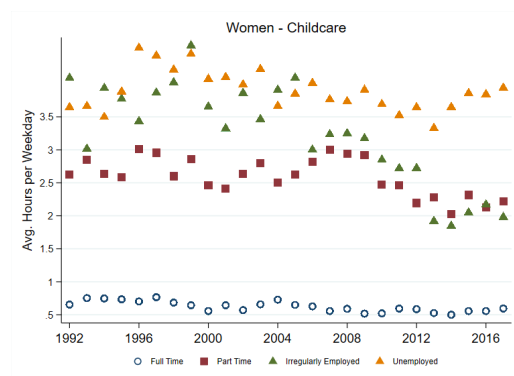
(a)



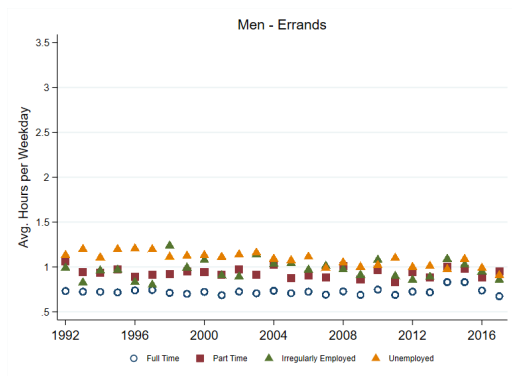
(b)



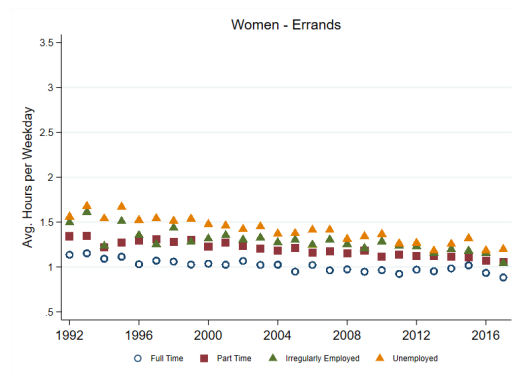
(c)



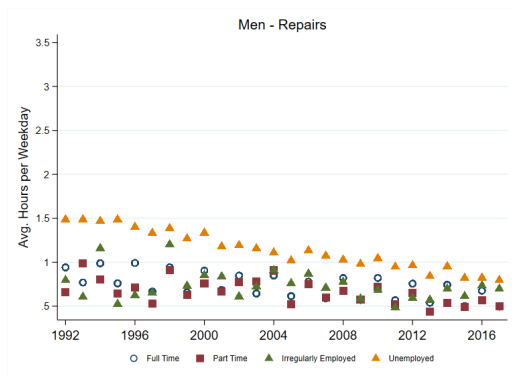
(d)



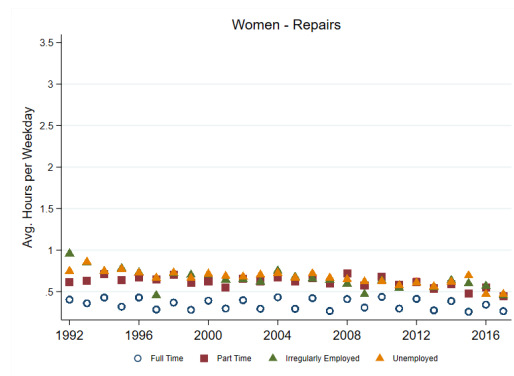
(e)



(f)

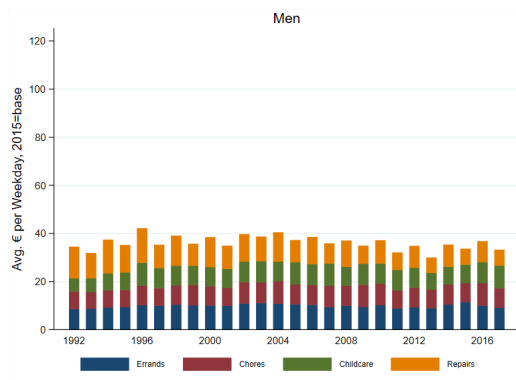


(g)

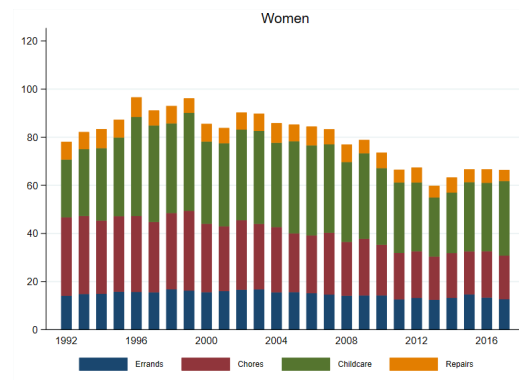


(h)

Figure 5: Average Weekday Value of Unpaid Household Labor



(a)



(b)

Figure 6: Average Weekday Hours Spent on Unpaid Labor by Gender and Labor Force Status



5 Conclusion

Using the time use and income data provided in the German Socio-Economic Panel, we constructed hourly estimates for unpaid labor at home with a replacement cost approach. We find that in real terms, the value of these services and time exceed the minimum wage and may be a reason why lower income households engage in higher levels of home production than high income households. Given this high valuation and the relative (un-)attractiveness of outside options (including the availability of e.g. childcare or other services) it may even be reasonable at the time. However, being out of the labor force as well as part time and marginal employment may work better for families in the moment, but carries long-lasting consequences for women when it comes to financial independence and retirement. Our research identified as woman taking on more unpaid tasks as they enter long-term relationships and marriages regardless of their employment status, while men scale back their activity and continue working full-time. This labor undoubtedly generates a value for the household unit, but not one that can be counted towards social security contributions or pension benefits.

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A Appendix

A.1 Job Classifications

Table 6: Jobs with Errand-like components

KldB92 Code	Description (German)
	Verkäufer/innen o.n.A.
6600	
6607	Verkaufshilfen o.n.A.
6621	Fachverkäufer/innen (Bürowirtschaft, Elektrogeräte, Unterhaltungselektronik, Foto, Spielwaren)
6622	Fachverkäufer/innen (Textil-, Lederwaren, Schuhe, Sportartikel)
6623	Fachverkäufer/innen (Hausrat, Wohnbedarf, Tapeten, Farben, Heimwerkerbedarf)
6624	Fachverkäufer/innen (Kraftfahrzeuge, Teile und Zubehör)
6625	Fachverkäufer/innen (Kosmetik, Körperpflege, Sanitätswaren)
6626	Fachverkäufer/innen (Uhren, Schmuck, Juwelen, Gold- und Silberwaren)
6627	Verkaufshilfen, a.n.g.
6628	Verkaufsaufsichten, -berater/innen, a.n.g.
6629	andere Fachverkäufer/innen
6720	Einzelhandelskaufleute, allgemein
6722	Einzelhandelskaufleute mit gemischtem Fachbereich
6725	Ambulante Händler/innen
6729	andere Einzelhandelskaufleute ohne Fachbereichsangabe
6731	Einzelhandelskaufleute (Nahrungs- und Genußmittel)
6732	Einzelhandelskaufleute (Bürowirtschaft, Elektrogeräte, Unterhaltungselektronik, Foto, Spielwaren)
6733	Einzelhandelskaufleute (Textil-, Lederwaren, Schuhe, Sportartikel)
6734	Einzelhandelskaufleute (Hausrat, Wohnbedarf, Farben, Tapeten, Heimwerkerbedarf)
6735	Einzelhandelskaufleute (Kraftfahrzeuge, Teile und Zubehör)
6736	Einzelhandelskaufleute (Kosmetik, Körperpflege, medizintechnische und Sanitätswaren)
6738	Einzelhandelskaufleute (Uhren, Schmuck, Juwelen, Gold- und Silberwaren)
6739	andere Einzelhandelskaufleute mit Fachbereichsangabe
6761	Abteilungsleiter/innen (Handel)
6762	Verkaufsleiter/innen (Handel)
6763	Filialleiter/innen (Verkaufsstellenleiter/innen)
6771	Einkäufer/innen, Einkaufssachbearbeiter/innen
6772	Einkaufsleiter/innen
7142	Pkw-Fahrer/innen
7440	Lager-, Transportarbeiter/innen, allgemein
7441	Waren-, Zeitungsaussträger/innen
7442	Beifahrer/innen (nicht Kraftfahrer/innen)
7443	Lagerarbeiter/innen
7444	Verladerarbeiter/innen
7445	Transportarbeiter/innen

Table 7: Jobs with Chore-like components

KldB92 Code	Description (German)
	Haus- und Ernährungswirtschaftler/innen o.n.A.
9210	
9211	Hauswirtschaftsleiter/innen
9212	Hauswirtschaftler/innen
9214	Beschließer/innen
9215	Hausdamen
9216	Techniker/innen für Hauswirtschaft und Ernährung
9218	Hauswirtschafts-, Verbraucherberater/innen
9219	andere Haus- und Ernährungswirtschaftler/innen
9230	Hausangestellte o.n.A.
9231	Haus(wirtschafts)gehilf(en/innen)
9232	Hauswirtschaftshelfer/innen (Reha)
9233	Zimmermädchen
9234	Schlafwagenschaffner/innen
9235	Kabinensteward(s/essen)
9237	Hauswirtschaftliche Helfer/innen, a.n.g.
9310	Textilreiniger/innen, -pfleger/innen, allgemein
9311	Gewerbegehilf(en/innen) im Färber- und Chemischreinigerhandwerk
9312	Chemischreiniger/innen
9313	Wäscher/innen und Plätter/innen
9314	Wäscher/innen
9315	Bügler/innen, Plätter/innen, Mangler/innen
9317	Textilreinigungs-, Textilpflegehelfer/innen
9318	Färber/innen (in der chemischen Reinigung)
9319	andere Textilreiniger/innen, -pfleger/innen
9340	Gebäudereiniger/innen, allgemein
9341	Glasreiniger/innen
9342	Fassadenreiniger/innen
9343	Raumpfleger/innen, -reiniger/innen
9349	andere Gebäude-, Raumreiniger/innen
9360	Fahrzeugreiniger/innen, -pfleger/innen o.n.A.
9361	Autowäscher/innen, -pfleger/innen
9369	andere Fahrzeugreiniger/innen, -pfleger/innen

Table 9: Jobs with Repair-like components

KldB92 Code	Description (German)
0510	Gärtner/innen, allgemein
0511	Landschaftsgärtner/innen
0512	Baumschul(en)gärtner/innen, Veredler/innen
0513	Zierpflanzen-, Staudengärtner/innen
0514	Pflanzenzüchter/innen, Samenbaugärtner/innen
0515	Gemüsegärtner/innen, Pilzanbauer/innen
0516	Obstgärtner/innen
0517	Gartenarbeiter/innen
0518	Friedhofsgärtner/innen
0519	andere Gärtner/innen
0530	Florist(en/innen), Blumenbinder/innen, allgemein
0531	Blumenhändler/innen
0532	Kranzbinder/innen
0537	Florist-, Blumenbinderhelfer/innen

0539	andere Florist(en/innen)
1810	Holzbearbeitungsmechaniker/innen, allgemein
1811	Holzeinteiler/innen, Holzsortierer/innen
1812	Holzsäger/innen, -trockner/innen
1813	Holzhobler/innen
1814	Holzfräser/innen, -bohrer/innen
1815	Holzschleifer/innen
1816	Holzwerkstoffhersteller/innen
1817	Holzbearbeitungsmechanikerhelfer/innen
1818	Holzleimbau fachkräfte
1819	andere Holzbearbeitungsmechaniker/innen
2610	Klempner/innen, allgemein
2611	Bauklempner/innen
2612	Geräte-, Maschinenklempner/innen
2613	Kühlerbauer/innen
2614	Blitzableiterbauer/innen (Klempner/innen)
2617	Klempnerhelfer/innen
2619	andere Klempner/innen
2690	Installateur(e/innen), Monteur(e/innen) o.n.A.
2691	Installateur(e/innen) und Klempner/innen
2697	Installateur-, Montagehelfer/innen, a.n.g.
2699	andere Installateur(e/innen), Monteur(e/innen)
3080	Uhrmacher/innen, allgemein
3081	Spezialuhrenmacher/innen
3082	Remonteur(e/innen), Uhrenprüfer/innen
3083	Uhrenmonteur(e/innen), Uhrteilesetzer/innen
3084	Uhrenreparateur(e/innen), -restaurator(en/innen)
3086	Uhrbestandteilmacher/innen
3087	Uhrmacherhelfer/innen
3089	andere Uhrmacher/innen
3510	Schneider/innen, allgemein
3511	Bekleidungsschneider/innen
3512	Herrenschneider/innen
3513	Damenschneider/innen
3514	Berufskleidungs-, Uniform-, Theater-, Trachtenschneider/innen
3515	Musterschneider/innen
3516	Änderungsschneider/innen
3517	Schneiderhelfer/innen
3518	Zuschneider/innen und zugehörige Berufe
3519	andere Oberbekleidungsschneider/innen
3520	Oberbekleidungsnäher/innen, allgemein
3521	Bekleidungsteilenäher/innen
3522	Bekleidungsfertiger/innen
3523	Näher/innen von Mänteln, Kostümen, Anzügen
3524	Näher/innen von Kleidern, Röcken, Blusen
3525	Berufs-, Sportbekleidungsnäher/innen
3526	Hand-, Änderungsnäher/innen
3527	Oberbekleidungsnäherhelfer/innen
3529	andere Oberbekleidungsnäher/innen

3530	Wäscheschneider/innen
3531	Wäschezuschneider/innen und verwandte Berufe
3532	Einrichter/innen (Wäschefertigung)
3533	Wäschenäher/innen
3537	Wäscheschneider-, Wäschenäherhelfer/innen
3539	andere Wäscheschneider/innen, -näher/innen
3580	Näher/innen, Textilnäher/innen o.n.A.
3581	Segelmacher/innen
3582	Kunststoff- und Schwergewebekonfektionär(e/innen)
3583	Schirm-, Lampenschirmnäher/innen
3584	Knopfloch-, Knopfannäher/innen
3589	andere Textilnäher/innen
4801	Ausbaufacharbeiter/innen o.n.T.
4802	Ausbauvorarbeiter/innen o.n.T.
4803	Ausbaupolier(e/innen), Ausbaumeister/innen o.n.T.
4804	Ausbau(fach)werker/innen o.n.T.
4807	Ausbauhelfer/innen o.n.T.
4830	Fliesen-, Platten- und Mosaikleger/innen, allgemein
4831	Fliesen-, Platten- und Mosaiklegerpolier(e/innen), -meister/innen
4832	Fliesen-, Plattenleger/innen
4833	Mosaikleger/innen
4837	Fliesen-, Platten-, Mosaiklegerhelfer/innen
4839	andere Fliesen-, Platten- und Mosaikleger/innen
4870	Zimmerer, allgemein
4871	Zimmer(er)poliere, -meister
4872	Schalungs-, Lehrgerüstbauer
4873	Treppenbauer (Holz)
4874	Holzfertigteilbauer, -montierer
4875	Ausbauzimmerer
4876	Restaurierungszimmerer
4877	Zimmererhelfer
4879	andere Zimmerer
5010	Tischler/innen, allgemein
5011	Bau- und Möbeltischler/innen
5012	Bautischler/innen
5013	Möbeltischler/innen (Handwerk)
5014	Montagetischler/innen (Handwerk)
5015	Betriebs-, Bühnentischler/innen
5016	Kunsttischler/innen, Restaurator(en/innen) im Tischlerhandwerk
5017	Tischlerhelfer/innen
5018	Holz(fach)werker/innen u.ä. Reha-Berufe
5019	andere Tischler/innen
5101	Maler/innen und Lackierer/innen o.n.A.
5102	Maler- und Lackierermeister/innen o.n.A.
5103	Maler- und Lackierer(fach)werker/innen u.ä. Reha-Berufe
5107	Maler- und Lackiererhelfer/innen o.n.A.
5109	andere Maler- und Lackierer/innen o.n.A.
5110	Maler/innen und Lackierer/innen (Ausbau), allgemein
5111	Lackierer/innen (Ausbau)

5112	Anstreicher/innen, Tüncher/innen, Weißbinder/innen
5113	Maler/innen und Tapezierer/innen
5114	Eisenentroster/innen und -anstreicher/innen
5115	Restaurator(en/innen) im Maler- und Lackiererhandwerk
5116	Fachberater/innen für Farben, Lacke und Kunststoffe
5117	Maler- und Lackierershelfer/innen (Ausbau)
5119	andere Maler/innen (Ausbau)
7960	Hausmeister/innen, allgemein
7961	Hausmeister/innen und Pförtner/innen
7962	Hauswart(e/innen)
7963	Schulhausmeister/innen, Schulhauswart(e/innen)
7964	Haushandwerker/innen, a.n.g.

Table 8: Jobs with Childcare-like components

KldB92 Code	Description (German)
	Sozialarbeiter/innen, Sozialpädagog(en/innen) o.n.A.
8610	
8611	- in der Arbeit mit Kindern, Jugendlichen und Familien
8630	Erzieher/innen o.n.A.
8631	Erzieher/innen in Kindertageseinrichtungen
8632	Erzieher/innen in der außerschulischen Kinder- und Jugendarbeit
8633	Heimerzieher/innen
8637	Erziehungshelfer/innen
8639	andere Erzieher/innen
8670	Kinderpfleger/innen
8677	Kinderpflegehelfer/innen
8690	Soziale Berufe ohne nähere Tätigkeitsangabe
8691	Sozialberater/innen, a.n.g.
8692	Kinderdorfmütter
8693	Jugendherbergsväter, -mütter
8694	Tagesmütter, -väter
8697	Soziale Helferberufe, a.n.g.
8699	andere soziale Berufe
9238	Kindermädchen (nicht Erzieherinnen oder Kinderpflegerinnen)

A.2 Weekday Valuation

Table 10: Average (Gross) Values of Household Labor per Weekday

	Men			Women		
	Unemployed	Part-Time	Full Time	Unemployed	Part-Time	Full Time
1995	53.20	39.68	32.36	127.72	90.93	48.83
2005	49.60	44.52	31.78	116.41	89.02	42.48
2015	51.43	55.06	41.42	123.39	88.80	49.23

A.3 Weekend Time Use

Figure 7: Average Saturday Hours Spent on Unpaid Labor by Gender

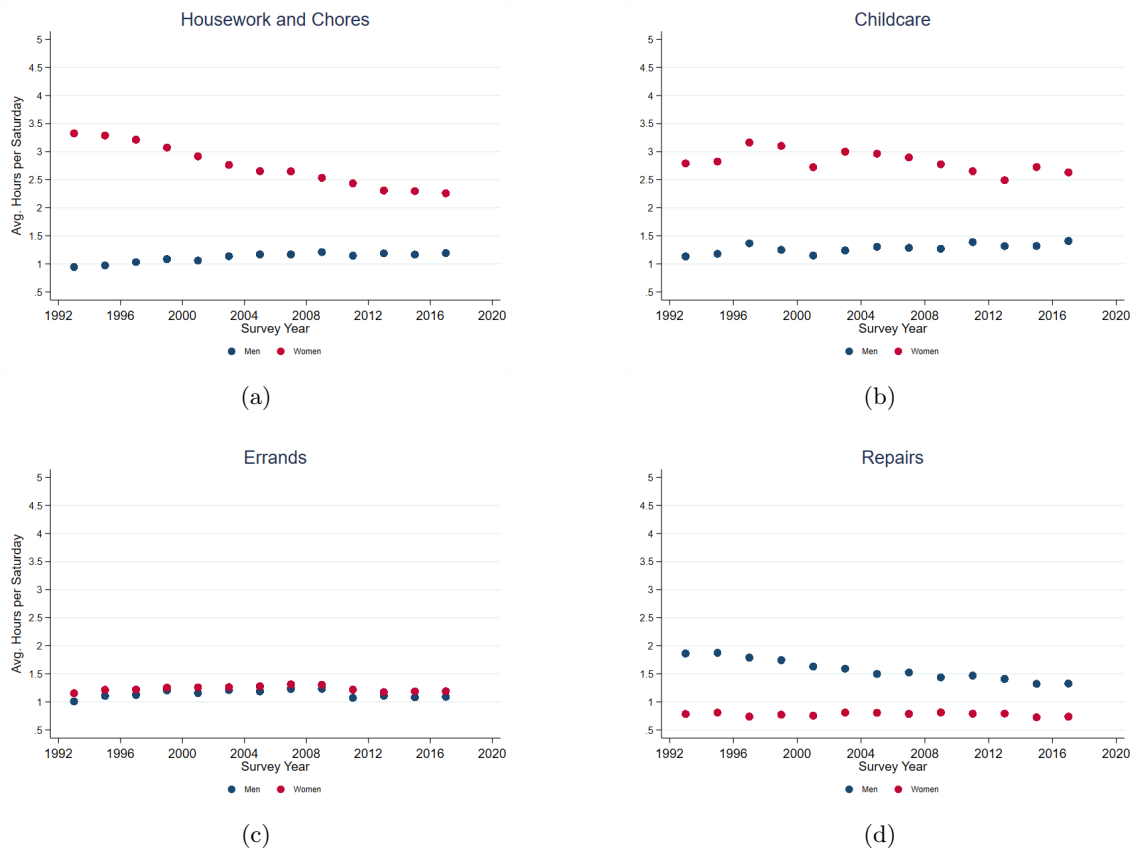
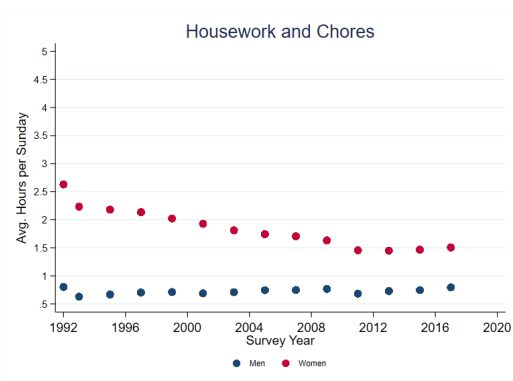
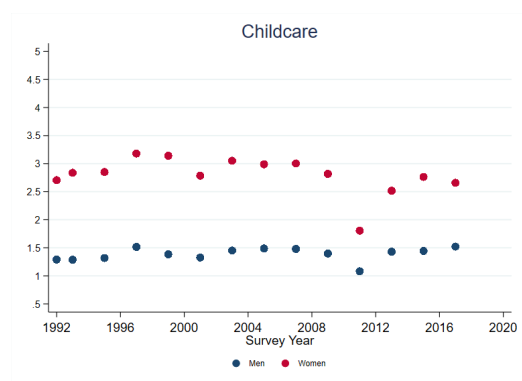


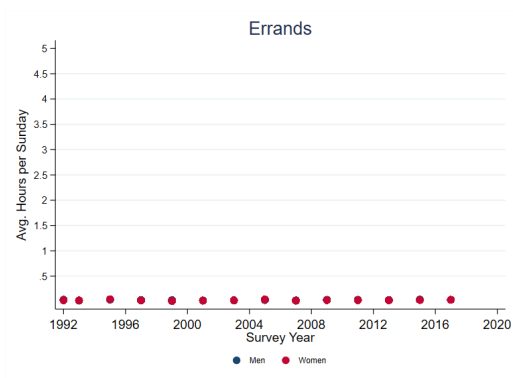
Figure 8: Average Sunday Hours Spent on Unpaid Labor by Gender



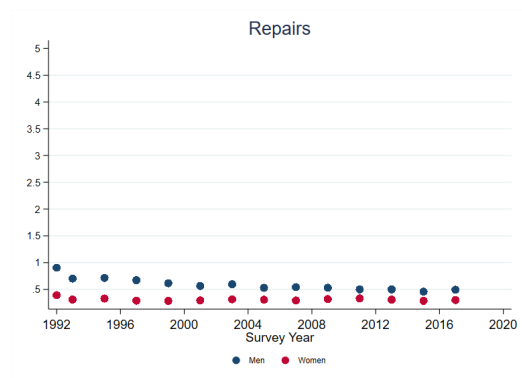
(a)



(b)



(c)



(d)