

# Intergenerational mobility of housework time in the United Kingdom

J. Ignacio Gimenez-Nadal<sup>a</sup>, José Alberto Molina<sup>a,b</sup>, Yu Zhu<sup>c,\*</sup>

<sup>a</sup> Department of Economic Analysis, University of Zaragoza, Gran Vía 2. 50005 Zaragoza. Spain

<sup>b</sup> IZA, Schaumburg-Lippe-Strasse 5-9, 53113 Bonn, Germany

<sup>c</sup> Economic Studies, University of Dundee, 3 Perth Road, Dundee, DD1 4HN, UK

## Abstract

*This paper analyzes the relationship between parents' time devoted to housework and the time devoted to housework by their children. Using data from the Multinational Time Use Study for the UK, we find positive intergenerational correlations in housework for both parents, indicating that the more time parents devote to housework, the more time their children will devote to housework. Using data from the British Household Panel Survey we find that a higher father-to-mother housework ratio is positively related with a higher child-to-mother housework ratio. We further explore father and mother's lagged weekly working hours, or the difference between them, to instrument the father-to-mother ratio of housework. The Instrumental-Variable estimates fully support the fixed-effect estimates, and suggest that the latter should be regarded as a lower bound. Our results contribute to the field of intergenerational mobility of behaviors.*

**JEL CODES:** J16, J22

**KEYWORDS:** *Housework, household, intergenerational transfers, Multinational Time Use Study, British Household Panel Survey.*

## Highlights

- study intergenerational mobility of housework using time use data and panel survey
- time use survey results show positive effect of both parents' housework time
- however, fixed-effect results indicate that only father-to-mother ratio matters
- our FE estimates should be regarded as a lower bound.

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\* Corresponding author at: Economic Studies, University of Dundee, 3 Perth Road, Dundee, DD1 4HN, UK. Tel: +44 1382 384378; Fax: +44 1382 384691.

Email addresses: [ngimenez@unizar.es](mailto:ngimenez@unizar.es) (J.I. Gimenez-Nadal), [jamolina@unizar.es](mailto:jamolina@unizar.es) (J. A. Molina), [yuzhu@dundee.ac.uk](mailto:yuzhu@dundee.ac.uk) (Y. Zhu)

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## 1. Introduction

In this paper, we examine the relationship between the time devoted to housework by parents and that by their children, for a sample of couples from the United Kingdom. Parents and children are, in the majority of cases, genetically related and they usually live together. Under this framework, we can presumably expect transmissions of preferences, values and/or social behaviors between generations (Doepke and Zilibotti, 2012; 2014). For instance, Fernández, Fogli and Olivetti (2004) show that working mothers transmit a set of beliefs (e.g., preferences) to their sons that increases their likelihood of marrying working women when adults. Also, previous literature has found intergenerational transmissions of divorce (Amato and DeBoer, 2001; Wolfinger, 2000) and fertility (Booth and Kee, 2009). Thus, parents seem to have a direct influence on their children's present and future behavior, and the analysis of the transmission of preferences and values from parents to children is relevant in both the labor market and household fields.

One of the attitudes that seems to be transmitted from parents to their children is that of the gendered division of housework, which has been universally observed and extensively studied. This gendered division of housework means first that women continue to specialize in household tasks (Gershuny, 2000; Gauthier, Smeeding and Furnstenberg, 2004; Sevilla et al., 2010; Gimenez-Nadal and Sevilla, 2012), and despite the increase in women's level of education and participation rates in the labor market, women continue doing most of the housework and parenting. In the case of the UK, this pattern is confirmed by Figure 1, based on a sample of couples with children aged 11-18 year in the British Household Panel Survey (BHPS). Whereas there is a clear negative correlation between mother's share of housework and her share of market work, her housework share never goes under 70%, regardless of whether she (and indeed her partner) has post-secondary education (denoted as Higher Education, or HE). Using data for the United Kingdom Time Use Survey 2000, the share of housework done by women out of the total time devoted to housework by both members of the couple is 79% on average, while for highly educated couples this share amounts to 72%. Thus, evidence using data for the UK shows that women continue doing most of household tasks.

Moreover, and as shown by previous evidence, the gendered division of housework is also reflected in the fact that women concentrate on routine and more time-intensive housework, such as cooking and cleaning, whereas men are more active in sporadic, less

time-intensive tasks, such as gardening and repairs (Cohen, 1998; Hersch and Stratton, 2002; Sevilla, Gimenez-Nadal and Fernandez, 2010; Grossbard, Gimenez-Nadal and Molina, 2014). In this sense, Fisher and Robinson (2011) show for a set of 23 countries women devote relatively more time to cooking and food related activities, shopping, and childcare, compared to men in those countries (including the UK). For the specific case of the UK, using data of couples from the United Kingdom Time Use Survey 2000 we observe that women devote more hours per day than men do to cooking and washing up (2.07 versus 0.31), general housework (2.17 versus 0.28), and shopping (0.63 versus 0.31). On the contrary, men devote comparatively more time to odd jobs in comparison to women (0.49 hours per day for men compared to 0.40 hours per day for women), which includes activities such as home/vehicle maintenance, pet care, repairs and collecting fuel.

Thus, attitudes towards the gender distribution of household labor seem to be transmitted from generation to generation, given the common patterns found in most countries and the stability of such patterns. However, the literature on the intergenerational transmission of the uses of time is very scarce (Cunningham, 2001; Bianchi et al., 2006; Cardoso, Fontainha and Monfardini, 2010; Alvarez and Miles, 2012, Solaz and Wolff, 2015). Against this background, we examine the relationship between the housework time of parents and that of their children, and explore the potential channels of the transmission of housework time from generation to generation. To that end, we first use diary data for the United Kingdom (2000), which contains information on individual activities throughout the 24-hour day. We find positive correlations between parents' and children's housework time for the UK: an increase of 10% in the time devoted to housework by fathers translate into an increase of 1.2% and 2% in the time devoted to housework by boys using the OLS and FE specifications, while an increase of 10% in the time devoted to housework by mothers translate into an increase of 1% and 1.4% in the time devoted to housework by girls using the OLS and FE specifications. Using our preferred specification, which focuses on the effect of housework division inequality on the child's involvement in domestic tasks, and potentially better allows for heterogeneity in the requirement of total housework time that may vary by demographic factors, health or taste, we find that a higher father-to-mother housework ratio is positively related with a higher child-to-mother housework ratio. In this sense, an increase of one unit in the father-to-mother housework ratio is associated with an increase in the boy-to-mother housework ratio of 0.2 and of 0.3 for the girl-to-mother housework ratio.

We alternatively use the British Household Panel Survey (BHPS), a long panel survey of households in the UK with information on weekly housework hours for all adults aged 16 and above in all waves. First, we estimate fixed-effect (FE) models which allow for time-invariant unobservables which might confound parents' housework time and bias intergenerational mobility estimates in conventional time use studies using cross-sectional data. Here we find that only father's housework time is positively correlated with that of a boy, as a 10% increase in the father's housework time increases the time devoted to housework by 0.46% for boys, according to the FE specification. However, using our preferred ratio specification, we find that a higher father-to-mother housework ratio is positively related with a higher child-to-mother housework ratio, as an increase of one unit in the father-to-mother housework ratio is associated with an increase in the child-to-mother housework ratio of 0.09 for boys and an increase of 0.1 for girls. We further explore father and mother's lagged weekly working hours, or the difference between them, to instrument the father-to-mother ratio of housework. The Instrumental-Variable (IV) estimates fully support the FE estimates, and suggest that our FE estimates should be regarded as a lower bound, despite Hersch and Stratton (1997, 2002) and Bryan and Sevilla (2011) all conclude that housework is effectively exogenous in the FE specification.

We contribute to the existing literature on the inter-generational transmission of behaviours and attitudes, inaugurated by Fernandez et al. (2004). Despite the existence of previous studies analyzing the inter-generational transmission of values and attitudes (see Furtado et al. (2013) for a review), very few papers have directly analyzed the transmission of time devoted to domestic work across generations. To the extent that housework time represents a significant portion of daily life and negatively impacts on women's labour supply, this paper focuses on a relevant issue. Second, while previous studies on time allocation decisions have greatly enhanced our understanding of what factors affect these decisions (Gershuny, 2000, 2009; Kalenkoski et al., 2005; Aguiar and Hurst, 2007; Connelly and Kimmel, 2007, 2009; Hamermesh and Lee, 2007; Berrington et al., 2008, Gimenez-Nadal and Molina, 2013), most of them are descriptive. By using both the FE and the IV methods, we present suggestive evidence of a causal link between the time allocation decisions of members of the same household in this paper.

The rest of the paper is organized as follows. Section 2 reviews the literature. Sections 3 shows the results obtained using time diary data. Section 4 shows the results obtained

with the BHPS. Section 5 sets out our main conclusions.

## **2. Literature review**

The literature has largely confirmed inter-generational transmissions of preferences or attitudes. Wilhelm et al. (2008), for the US, estimate the correlation between the generosity of parents and the generosity of their adult children, finding that the elasticity of children's giving with respect to parents' giving is positive for both religious and secular donations. Grønhøj and Thøgersen (2009) find positive correlations when examining parent-child similarities of general values, as well as specific attitudes and behaviors in the environmental domain, using a sample of Danish families. Bulte and Horan (2011) propose an empathy model of cultural transmission to capture the evolution of preferences in a population. Dohmen et al. (2012) analyse the inter-generational transmission of risk and trust attitudes, finding positive evidence of such transmission. Necker and Voskort (2014) investigate whether children and parents show a similar willingness to take risk in their choice of occupation in Germany, and find that fathers' earnings risk is significantly positively related to sons' earnings risk. Croft et al. (2014) find that fathers who help with household chores are more likely to raise daughters who aspire to traditionally male dominating (and potentially higher paying) careers. Anger and Heineck (2010) and Anger (2012) find evidence on the intergenerational transmission of cognitive and non-cognitive skills.

In the specific case of the intergenerational transmission of attitudes and preferences in the uses of time, we find very few studies. Cunningham (2001) shows that the parental division of labor when a son was growing up affects the adult son's participation in routine housework once he marries. Cardoso et al. (2012) find positive evidence for France, Germany and Italy on the link between time allocation by parents and by youngsters. Alvarez and Miles (2012) find for a sample of Spanish families a significant positive correlation between a more egalitarian parents' allocation of housework and a less asymmetrical distribution of domestic chores between sons and daughters. Solaz and Wolff (2015) find for a sample of French couples a positive relationship between child's and parents' housework time. Additionally, previous evidence has shown a gendered difference in the intergenerational transmission of attitudes, as the association between mother (father) and son is different from the association between mother (father) and

daughter (Alvarez and Miles, 2012; Solaz and Wolff, 2015). In this sense, previous research found that girls and boys are assigned different housework tasks (Antill et al., 1996; Benin and Edwards, 1990; Cogle and Tasker, 1982; White and Brinkerhoff, 1981), which may explain why the gender of the child matters for the intergenerational transmission of attitudes and behaviors.

Regarding the identification of the intergenerational transmission of attitudes or behaviors, some literature has linked the past behavior of the parents with the current behavior or attitudes of the children. Cunningham (2001) relates the parental division of labor when a son was growing with the adult son's participation in routine housework once he marries. Clasen (2009) provides estimates of the intergenerational persistence of Body Mass Index (BMI) between women and their children when both are at similar stages of the lifecycle. Johnston et al. (2013) analyze the relationship between the mental health of the cohort members at average age 30 and their mother's mental health at average age 36. Stella (2013) relates the acquisition of human capital by parents in the period 1920-1956 to the acquisition of human capital by their children when the latter become 50 years of age.

On the contrary, some other literature on the intergenerational transmission of values or attitudes analyzes current values of both parents and children. Black and Deveraux (2011) review the intergenerational mobility (e.g., transmission) of economic outcomes such as earnings, employment and education, and they link current outcomes of the children with that of their parents. Héroult and Kalb (2015) analyze the correlation of labor market outcomes of parents and their children in Australia using current values of parents and their children. Carlson et al. (2014) analyze the subjective well-being among preadolescents and their parents, analyzing subjective well-being measures in the same period for parents and children. As argued by Black and Deveraux (2011), when this approach is used no causal effect can be retained, as there might be both unmeasured factors and reverse causality issues that bias the coefficient estimates. Under this framework, we can only talk about intergenerational correlations, despite several methods have been proposed to obtain causal relationships which include twin parents (Behrman and Rosenzweig 2002), adopted children (Plug 2004; Björklund et al. 2006) and instrumental variables (Black et al., 2005; Oreopoulos et al. 2006, Stella, 2013).

Among the mechanisms that can explain the associations between parents' and children's uses of time, we may consider three possible explanations: intergenerational

transmission of preferences, parental role model, or imitation. In the case of the intergenerational transmission of preferences, previous literature has shown that parents influence preference formation of the child (Wolfinger, 2000; Amato and DeBoer, 2001; Booth and Kee, 2009), in many cases through the culture of the country (Carroll et al., 1994; Fernandez et al., 2004; Fernandez and Fogli, 2006, 2009; Giuliano, 2007). Regarding the parental role model, derived from the Akerlof and Kranton (2000)'s model on gender identity, there are gender norms about what a man or a woman should or should not do, with a social cost of deviating from the behaviors expected under these norms. Under these circumstances, parents may try to transmit these roles to their children so that they will conform to these gender norms of the society in the future. However, it could be that children just imitate their parents' behaviors, in a "doing by watching" attitude. As argued by Solaz and Wolf (2015), disentangling any of the channels through which parents' and children's behaviors are related is very complicated.<sup>1</sup>

Alvarez and Miles (2012) find that the division of household labour between the parents affects the time devoted to children in a way that reflects stereotypes of men's and women's domestic tasks. To explain the division of household tasks among the members of couples we can find several competing theories (see Auspurg et al. (2014) for a review). The specialization theory proposed by Becker (1965) establishes if the partners have identical levels of human capital, we should observe that both sexes do similar shares of market work and housework, which goes against recent evidence on the distribution of household labor (Brines, 1994; Aguiar and Hurst, 2007; Gimenez-Nadal and Sevilla; 2012). Alternative theories have been proposed to reconcile with empirical evidence, which includes that of social gender norms (Lennon and Rosenfield, 1994; Baxter and Western, 1998; Bianchi et al., 2000). This theory refers to the existence of societal gender norms that limit the power of women in both within the household and in the society, which makes women stick to a predetermined gender role where women are most responsible for household work. However, these gender roles are effective only if deviating behaviors are socially sanctioned or if norm-compliance is rewarded. Given the weakness of these mechanisms in modern societies, an alternative explanation for individuals conforming to the existing gender norms is because they internalize them

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<sup>1</sup> The long panel of the BHPS allows us to check the persistence of these teenagers' housework time into early adulthood. For example, for the sample of 16-18 year olds who had been tracked till they were at least 25 in the BHPS, the correlation coefficient of housework time between the first and the last wave (on average 12 years apart) is around 0.19 and statistically significant at 0.1%. This evidence suggests that imitation is not the main reason for the relationship between housework of parents and their children.

(e.g., gender identity as proposed by Akerlof and Kranton (2000)). The model of gender identity assumes that social gender norms are internalized and thus individuals who choose work arrangements which deviate from arrangements prescribed by social gender norms will incur a penalty in their utility compared to individuals whose choices affirm their gender self-image. Auspurg et al. (2014) reject the theory of gender identity in an experimental context using the UKHLS Innovation Panel and they find no evidence that men's preferences differ systematically from those of women, or that either men or women prefer the traditional male breadwinner arrangements.

### **3. The United Kingdom Time Use Survey (2000)**

For the analysis of the relationship between parents' and children's housework time, we use data from the United Kingdom included in the Multinational Time Use Survey (MTUS).<sup>2</sup> The MTUS is an ex-post harmonized cross-time, cross-national, comparative time use database, coordinated by the Centre for Time Use Research (CTUR) at the University of Oxford. It is constructed from national randomly-sampled time-diary studies, with common series of background variables, and total time spent in 41 activities (Gershuny, 2009). The MTUS provides us with information on individual time use, based on diary questionnaires in which individuals report their activities throughout the 24 hours of the day.

We construct a sample of young people aged 11-18, who are living with both parents aged 60 or below. Furthermore, in order to analyze how the housework time of parents relates to the housework time of their children, we need time-use information for both members of the couple. This limitation prevents us from carrying out a more general and up-to-date analysis, as the 2000 survey is the only UK survey included in the MTUS that has been harmonized and that has information for all the members of the household. Given previous literature showing that the association between mother (father) and son is different from the association between mother (father) and daughter (Alvarez and Miles, 2012; Solaz and Wolff, 2015), we develop our analysis by the gender of the child.

The MTUS activities are defined as the 'primary' or 'main' activity individuals were engaged in at the time of the interview, and we are able to add up the time devoted to any

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<sup>2</sup> Information on the variables, and on how to access the data, is available on the MTUS website: <http://www.timeuse.org/mtus>. See Fisher et al. (2011) for a full description of the MTUS documentation. We use version W53 (accessed in October 2010) of the MTUS.



activity of reference (e.g., paid work, leisure, housework) as ‘primary’ activity. We consider the time devoted to housework by both parents and their children, measured in hours per day. Our definition of housework includes the total time devoted to the following activities: “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel”.

### ***3.1. Empirical evidence***

According to our category of “housework”, children devote around 1 hour per day to these activities, while fathers and mothers devote 2.1 and 4.5 hours per day, respectively (see Table A1 in Appendix).<sup>3</sup> This gender gap in housework of mothers is consistent with Gimenez-Nadal and Sevilla (2012) who find a gender gap in housework favoring women in the UK during the 2000s. By gender of the child, we find that boys devote less time to housework compared to their female counterparts (e.g., 0.85 vs. 1.21 hours per day to housework for boys and girls, respectively), and in households where there is at least one boy fathers devote 0.2 more hours per day to housework compared to households where there are no boys. Furthermore, non-participation in housework activities on a daily basis is more common for boys compared to girls as a higher proportion of boys (36.63%) compared to girls (22.14%) report no participation in housework activities.

*Insert figure 2A here*

Figure 2A shows k-density functions for the time devoted to housework activities for boys, mothers and fathers, on the one hand, and girls, mothers and fathers, on the other. To be consistent with the econometric model we estimate next, we transform the original housework time to its log, adding the unity to the time devoted to housework time before taking logs to allow for zero hours. We observe that a high proportion of boys report no time in housework, while the proportion of girls reporting no housework is lower. Also, housework time has a higher dispersion for boys compared to girls, as the Coefficient of Variation (CV) yield higher values in the case of boys (CV=1.75) compared to girls

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<sup>3</sup> In a previous version of the paper, we also analyzed the time use patterns of children and their parents for Germany (2001), Italy (2002) and Spain (2002) using surveys included in the MTUS. A common characteristic of this pattern is that in all the countries children devote around 1 hour per day to housework. Evidence that children have a low participation in housework chores can be also found in Bonke (2011) for Denmark, Cardoso et al. (2010) for France, Italy and Germany, Alvarez and Miles (2012) for Spain, and Solaz and Wolff (2015) for France. Additionally, mothers in Italy and Spain devote a relatively high amount of time to housework compared to mothers in the UK, which is consistent with prior studies showing that in the Mediterranean countries there is a large gender gap in housework favoring women, which makes these countries especially inegalitarian in the gender distribution of household labor (Sevilla, 2010; Sevilla et al., 2010; Gimenez-Nadal et al., 2012).

(CV=1.25). In the case of fathers and mothers, the dispersion of housework time is higher for fathers compared to mothers, as the CV yield higher values in the case of fathers (CV=1.07) compared to mothers (CV=0.56).

Hence, housework time is more evenly distributed for mothers compared to fathers, and for girls compared to boys. Such differences may indicate that while participation in housework activities is more sporadic for fathers, involvement in housework for mothers can be seen as a “normal” behavior of the household members, consistent with previous evidence on gender roles (Álvarez and Miles, 2003; Bittman et al. 2003; Evertsson and Nermo, 2004; Gimenez-Nadal et al., 2012) and the existence of typical “male” and “female” tasks (Cohen, 1998, 2004; Hersch and Stratton, 2002; Sevilla et al., 2010) where “male” tasks are sporadic and refers to household maintenance and odd jobs.<sup>4</sup> Furthermore, previous research found that girls and boys are assigned different housework tasks (Antill et al., 1996; Benin and Edwards, 1990; Cogle and Tasker, 1982; White and Brinkerhoff, 1981), and to the extent that boys may be assigned to more “sporadic” household tasks it can explain the higher dispersion of boys’ housework time compared to that of girls. All this evidence may indicate that father’s (mother’s) housework time is more related to boy’s (girl’s) housework time than to girl’s (boy’s) housework time.

*Insert figure 3A here*

Finally, Figure 3A shows the raw relationship between children’s and parents’ housework times, by gender of the child. The figures plot the average time devoted to housework by children for each time devoted to housework of the parent; that is, for all households with the same amount of time devoted to housework by the father/mother, we average the time devoted to (log of) housework by the children, by gender. We then (scatter) plot mean housework time of children (y-axis) on the time devoted to housework by fathers and mothers (x-axis). We have also added a linear fit to see the extent to which scatters are distributed following a linear relationship.<sup>5</sup> We observe that the linear fit

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<sup>4</sup> According to a recent survey carried out in the UK for 1,000 working mothers, when asked about who takes primary responsibility of the different household chores in their homes, men are responsible for only 3 activities (empty the bins, change light bulbs and do a spot of DIY) while women are responsible for 36 activities which includes cooking, ironing and cleaning, among others ([www.mumsnet.com](http://www.mumsnet.com)).

<sup>5</sup> For both the scatter plot and the linear fit we must take into account that the number of fathers/mothers doing one hour of housework is different to the number of fathers/mothers doing 3 hours of housework, for instance. In this sense, we need to weight each observation (average housework of father/mother-average housework time of boy/girl) by the number of diaries included in the calculation of the average housework time. Thus, we include proportional weights in both the scatter plot and the linear fit, where the weights are built as the ratio of the number of diaries out of the total

points toward a positive association between the time devoted to housework by parents and the time devoted to housework by their children, as the slopes for father’s housework time regarding boy and girl’s housework time are 0.17 and 0.16, and the slopes for mother’s housework time regarding boy and girl’s housework time are 0.13 and 0.12.

We propose a way to control for the permanent heterogeneity of individuals/households preferences for housework by normalizing housework time for parents and children. The reason is that different types of households may have different preferences for housework time (e.g., by family size or age of the parents) and thus both the father and mother devote more time to housework as they prefer, for instance, a cleaner house. Furthermore, previous literature has shown the importance of the gender distribution of household labor on children’s housework time (Alvarez and Miles, 2012). Thus, we normalize the housework time of the father, and the child, by dividing by the mother’s time in housework in the household, as mothers present a higher participation rate in housework time. We define the ratios

$$\text{Child-mother housework ratio} = \frac{\text{Child's Hw}}{\text{Mother's Hw}} \text{ and}$$

$$\text{Father-mother housework ratio} = \frac{\text{Father's Hw}}{\text{Mother's Hw}} .^6$$

*Insert figure 2B here*

In our current sample, the child-mother and father-mother housework ratios take values of 0.385 and 0.883. Figure 2B shows k-density functions for the child-mother and father-mother housework ratios, and we observe that their values are concentrated towards zero, despite there is a high dispersion in their values as the CV of the ratios are 2.93 and 2.73 for child-mother and father-mother housework ratios, respectively. Figure 3B shows the raw relationship between child-mother and father-mother housework ratios, and we observe that the linear fit points toward a positive association between the ratios as the slopes for the ratios for boys (0.19) and girls (0.29) are statistically significant at conventional levels.

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number of diaries. This explains why dots have different sizes, as the size of the dot is proportional to the proportion of diaries included in it.

<sup>6</sup> We have dropped the cases where the mother reported zero hours of housework as it leads to missing values of our variables of interest. For consistency reasons, in the analysis of total housework times we restrict the analysis to a similar sample.

*Insert figure 3B here*

### **3.2 Empirical strategy**

Using an adaptation of Black and Devereux (2011) and Stella (2013), who examined human capital transfers, we regress the time dedicated to housework by the children on the time devoted to housework by the fathers and mothers of those children. In this sense, we regress the log of housework time of children on the log of housework time of the father and the mother. We thus estimate the following equation:<sup>7</sup>

$$\ln \text{Time}_{ihj} = \alpha_i + \beta_1 \ln \text{Father's Time}_{ihj} + \beta_2 \ln \text{Mother's Time}_{ihj} + \gamma X_{ih} + \delta \text{Day}_{ihj} + \varepsilon_{ihj} \quad (1)$$

where the dependent variable  $\ln(\text{Time}_{ihj})$  denotes the log of the time devoted to housework by child “i” in household “h” and day “j”, with this being expressed as a linear function of (log) time dedicated to housework by parents of child “i” in household “h” and day “j”. The indicators of mobility  $\beta_1$  and  $\beta_2$  represent the elasticity of children’s time with respect to their parents’ time, with an elasticity of 0.5 implying that a 10% difference between two families translates into an average difference of roughly 5% between their children’s times.

The set of socio-demographic variables  $X_{ih}$  includes the children’s characteristics (gender, age, and work status), parent’s characteristics (age, education, work status) and household characteristics (household size, number of children, and whether the household owns the dwelling).<sup>8</sup> We specifically include parents’ ages to capture differences in housework time behaviors across parental lifecycles, and day-of-the-week dummies to scale the day of the week (ref.: Saturday). Finally,  $\varepsilon_{ihj}$  represents the error term of the

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<sup>7</sup> However, as we observe a high proportion of “zeros” in the time devoted to housework by the children (23% of observations in the pooled sample), there can be some dispute regarding the selection of alternative models, such as that of Tobin (1958). According to Frazis and Stewart (2012), OLS models are preferred in the analysis of time-allocation decisions, and Gershuny (2012) argues that traditional diary data can still produce accurate estimates of mean times in activities for samples and subgroups. Foster and Kalenkoski (2013) compare the use of Tobit and OLS models in the analysis of the time devoted to childcare activities, finding that the qualitative conclusions are similar for the two estimation methods. Thus, we rely on OLS models, although we have alternatively estimated Tobit models, and our qualitative conclusions are the same (available upon request). It is not possible to apply a conditional Fixed-Effects Tobit model as there does not exist a sufficient statistic allowing the fixed effects to be conditioned out of the likelihood (Greene, 2004), and thus we rely on a Random-Effects Tobit model when considering the panel data structure of the data.

<sup>8</sup> Column 1 in Table A1 shows means and standard deviations for our explanatory variables. Columns (2) of (3) of Table A1 show the set of demographic characteristics by the gender of the child, and Column (4) shows the difference in the set of demographic characteristics between the samples of boys and girls. Few differences between the boy and girl samples emerge, and related to mother’s educational level and father’s work status.

equation.<sup>9</sup>

Given that we have two diaries per child, and also for their parents, we use 2 estimators. The first one refers to the OLS model, where we do not take into account the unobserved heterogeneity of individuals. This is the simplest type of estimator, and even though we use the logarithm of housework of parents and their children, the transformed variables do not follow a normal distribution, which makes the error terms of regressions not homoskedastic. Thus we correct our regressions by obtaining robust standard errors. Also, given that there may be 2 or more children per household we cluster the estimator at the household level to correct for correlation in the error term between siblings. The second estimator refers to the Fixed-Effects (FE) estimator, which controls for the unobserved heterogeneity of individuals. Under this framework, the unobserved heterogeneity of individuals is captured by the term  $\alpha_i$ , defined at the individual level.

As an alternative specification, we estimate the child-mother housework ratio as a function of the father-mother housework ratio. This specification would allow us to analyze how the gender distribution of household tasks between parents is related to child's involvement in household tasks. We estimate the following equation:<sup>10</sup>

$$\text{Child-mother housework ratio}_{ihj} = \alpha_i + \beta_3 \text{Father-mother housework ratio}_{ihj} + \gamma X_{ih} + \delta \text{Day}_{ihj} + \varepsilon_{ihj} \quad (2)$$

where the dependent variable  $\text{Child-mother housework ratio}_{ihj}$  denotes the ratio of housework time done by child "i" in household "h" and day "j" in relation with her/his mother's housework time.

### 3.3 Results

Columns (1) to (4) in Table 1 show the results of estimating Equation (1) on the time devoted to housework by boys and girls, according to the OLS and FE estimators. We find positive correlations between parents' and children's housework time, indicating that

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<sup>9</sup> Whether the household pays for domestic help or not could be a relevant factor in the amount of housework done by both parents and children. However, there is no information on whether the household has any domestic paid help in the UKTUS. In the case of the BHPS, while it is possible to find out the use of paid domestic help on household jobs such as grocery shopping, cooking, cleaning, washing and ironing from wave 6 onwards, the proportion of mothers reporting the use of paid domestic help for at least one of those tasks is less than 4%. We have alternatively included a dummy variable of paid domestic help in the household, and the coefficient is never statistically significant at the 5% level (results available upon authors' request).

<sup>10</sup> Here we do not apply the logarithm to the ratios, as they would lead to negative values for the two ratios.

the more time parents devote to housework, the more time their children devote to housework. According to our OLS estimator, we find correlations of 0.12 and 0.08 between fathers' housework time, on the one hand, and boy and girl's housework time, on the other. In the case of women, we find correlations of 0.10 between mothers' housework time, on the one hand, and boy and girl's housework time, on the other. Given that children's and parents' housework time has been transformed to logarithm, we can interpret these results in terms of elasticities: a difference of 10% in the time devoted to housework by fathers translates into a difference of 1.24% and 0.84% in the time devoted to housework by boys and girls, while a difference of 10% in the time devoted to housework by mothers translates into a difference of 1% in the time devoted to housework by boys and girls.

When we apply the FE estimator, results are roughly maintained, as there are positive correlations between parents' and children's housework time, indicating that the more time parents devote to housework, the more time their children devote to housework. According to our FE estimator, we find correlations of 0.21 and 0.07 between fathers' housework time, on the one hand, and boy and girl's housework time, on the other. In the case of women, we find correlations of 0.10 and 0.14 between mothers' housework time, on the one hand, and boy and girl's housework time, on the other. Thus, a difference of 10% in the time devoted to housework by fathers translates into a difference of 2.08% and 0.74% in the time devoted to housework by boys and girls, while a difference of 10% in the time devoted to housework by mothers translates into a difference of 0.91% and 1.42% in the time devoted to housework by boys and girls. The finding that the effect of father's housework is larger for boys whereas that of mother is larger for girls is consistent with earlier studies. Unfortunately, we have no time-variant variables except for days when the diary was answered, which are included in the regressions, and thus we take these results as complementary and not as main results, given that we cannot control for the observed heterogeneity of children and their parents.

Columns (5) to (8) in Table 1 shows the results of estimating the child-mother housework ratio as function of the father-mother housework ratio, for the OLS and FE specifications, respectively. We find that the father-mother housework ratio is positively related with the child-mother housework ratio for boys and girls in both the OLS (e.g., 0.20 and 0.31 for boys and girls, respectively) and the FE (e.g., 0.22 and 0.30 for boys and girls, respectively) estimators. In this sense, an increase of one unit in the father-

mother housework ratio is related with an increase of 0.20 and 0.31 in the boy/girl-to-mother housework ratio. According to the FE estimator, an increase of one unit in the father-mother housework ratio is related with an increase of 0.22 and 0.30 in the boy/girl-to-mother housework ratio. These results indicate that the higher the time of the father in housework the higher the time devoted by both boys and girls to housework, relative to the time devoted by the mother, pointing toward the more important role played by father's housework in explaining the time devoted to housework by the child.

We have also analyzed the relationship between parents' and children's housework time when we consider that these relationships may vary depending on the economic status of the parents. For instance, it could be that, in those couples where one of the members does not participate in the labor market, the members are more concerned about their children's behavior and well-being (single-earner couples have stronger preferences for raising their children by themselves). As a result, we could expect different patterns of behavioral transmission, e.g., larger correlations of parents' housework with the housework of their children. A second factor that may condition the correlations observed in the analysis is education. It could be that more educated parents are more concerned about the educational and attitudinal behavior of their children. On the other hand, it could be that as more educated parents have a higher opportunity cost, they devote less time to housework, compared to less-educated parents, which negatively affects the positive correlation between parents' and children's housework time. Despite results for the log of parent's housework time differ depending on the labor status and education of the mother, results for the ratio of housework are consistent (e.g., father-mother and child-mother housework ratios are positively related). However, in some cases sample sizes are very small, and thus we consider these results (shown in Table A2 of the Appendix) as not conclusive.

#### **4. The British Household Panel Survey**

The British Household Panel Survey (BHPS) is the longest longitudinal survey of households in the UK, starting in 1991.<sup>11</sup> The original sample members, including their children once they turn 16, together with any partners, are interviewed annually in

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<sup>11</sup> The last wave of the BHPS was conducted in 2008. From 2009 onwards, the BHPS was merged into the new UK Household Longitudinal Survey (UKHLS), also known as Understanding Society.

subsequent years in order to maintain the representativeness of the sample. As most household surveys, the BHPS collects key information on changes in family composition, education, labour market experience, individual earnings, and family incomes and benefit receipts. However, the BHPS also asks all adults in all but the first wave, the number of housework hours per week.<sup>12</sup>

#### ***4.1 Sample selection***

We construct a sample of young people aged 16-18, who are living with both parents aged 60 or below, in all waves. The very small group of mothers (approximately 0.5%) reporting zero housework in an average week are dropped, on the ground that these are more likely to be measurement errors. The final sample consists of a short-panel (maximum three waves) of 2270 observations (person-waves) of boys and 2409 observations of girls, from just over 1000 distinct young persons of each gender.

Table A3 presents summary statistics of key variables, by gender. While boys aged 16-18 only spend 0.29 hours per day on housework, their female counterpart spend 0.44 hours, or over 50% more time on household chores. Fathers of boys spend 0.81 hours per day on housework whereas fathers of girls only spend 0.73 hours. The gap of 0.08 hour is statistically significant at the 1% level. Consistent with the traditional household division of labour, mothers do a lot more housework per day than fathers, with a mean of about 2.93 hours per day. However, there is no statistical significant difference in mother's housework hours by the child's gender. There are 30.1%, or twice as many boys as there are girls, who do no housework. Fathers of boys are 2.1 percentage points less likely to be doing no housework at all. With a sample mean of 0.129, this gap is statistically significant at the 5% level.

*Insert table A3 here*

Comparing the time devoted to housework by the individuals in the UKTUS and the BHPS, we observe that daily housework in the UKTUS is higher. Here we may think of several reasons. The first one refers to measurement errors. An extensive literature confirms the reliability and validity of diary data and their superiority over other time-use

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<sup>12</sup> The key question for this paper is "About how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry?". Although the BHPS asks who is mainly responsible among spouses for grocery shopping, cooking, cleaning/hovering, washing/ironing, and looking after children aged 12 or under, there is no breakdown by hours.



surveys based on stylized questions, asking respondents to estimate time in activities on a ‘typical day’ (e.g., Juster and Stafford, 1985; Robinson, 1985). In the labor supply literature, for example, Klevmarken (2005) argues that information on actual hours of work from time-use surveys is more relevant than normal hours or contracted hours generally reported in stylized questions. The author shows that time-use data yields much smaller estimates of wage rate effects compared to measures of normal hours of work, which may have important implications for tax policy design, among others. The second reason is related to the different frequency of the data. The UKTUS collects one weekday and one weekend day for each individual, and to the extent that individuals devote less time to housework activities in weekdays in comparison with weekend days, the fact that we average over weekends and weekdays makes this average not proportional. However, the measure of housework included in the BHPS should be a good indicator as the computation is done over the complete week.

#### ***4.2 Main results***

Columns (1) to (4) of Table 2 show the OLS and FE estimates of the conventional intergenerational mobility model of housework behaviour, using the same specification as for Table 1.<sup>13</sup> Again, we add unity to daily housework hours before taking logs to allow for zero observations. OLS results suggest that the mother’s housework time is negatively correlated with that of a boy, but positively correlated with that of a girl, although the latter correlation is statistically insignificant. On the other hand, the positive effect of the father is not only statistically significant at the 1% level for both boys and girls, but also non-negligible in sizes – a 10% increase in the father’s housework time increases the time devoted to housework by 0.93% for boys and 0.64% for girls.

*Insert table 2 here*

When we allow for time-invariant unobservable heterogeneity which would bias cross-sectional estimates, the positive effect of the father are roughly halved for both boys and girls, and only remain statistically significant at 10% for boys. This implies that permanent household heterogeneity selection explains a significant proportion of the positive effect of father’s housework time found in cross-sectional studies.

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<sup>13</sup> Given BHPS’s long time span, we additionally control for a linear time trend.

Columns (5) to (8) of Table 2 show the OLS and FE estimates of the alternative functional form of housework time ratio, which better allows for heterogeneity in the requirement of total housework time by demographic factors, health or taste. Also, the total amount of housework done in the household is presumably equal to the sum of housework done by parents and children (in the absence of paid domestic help and other household members) and if this total amount does not vary much across households, at least after controlling for the unobserved family fixed effect and other control variables, then there is no surprise that only father's time has an effect. Thus, we consider this specification of the relationship between parents and children's housework time our preferred one. The OLS coefficients on the ratio of father-mother housework time in the child-mother housework time ratio equations are 0.121 and 0.095 for boys and girls respectively, and both are statistically significant at the 1% level. Once we account for permanent household heterogeneity, the corresponding FE coefficients on the ratio of father-mother housework ratio are 0.086 and 0.101 for boys and girls, with the former significant at 1% and the latter significant at nearly 5%.

The positive effect for fathers' housework time, but not for mothers, in FE specifications is a significant finding which sheds new light on the intergenerational mobility of housework behaviour studies which are plagued by the inability to make causal inferences with time-use data.

### ***4.3 Further results***

We further check for evidence of heterogeneous effect of parent's housework time on young person's housework, with respect to mother's employment status and educational qualifications. To save space, we only present the FE coefficients, but on both functional form specifications in Table 3. As we only have around 800 distinct young persons for our FE estimation, we expect some of these estimates to be imprecisely determined, due to a lack of statistical power.

*Insert table 3 here*

Indeed, some of the FE coefficients are no longer statistically significant. Nevertheless, they are qualitatively similar to the main results in Table 2. For our preferred ratio form specification, the effects of the father-mother housework ratio are statistically significant for boys at the 1% level for mothers not working or mothers without higher educational

qualifications. As for girls, the effects of the father-mother housework ratio are only significant for mothers not working at the 10% level and for mothers with higher qualification at the 1% level.<sup>14</sup>

Whereas FE models control for permanent unobserved heterogeneity, they might exacerbate the measurement error problem leading to downward biased estimates especially when the time dimension is short as in our case (see e.g. Buddelmeyer et al. 2008). Therefore our FE estimates should be regarded as a lower bound. We addressed this problem using an IV strategy. Of the handful of studies on housework time that have applied both FE and IV methods, Hersch and Stratton (1997, 2002) and Bryan and Sevilla (2011) all conclude that housework is effectively exogenous in the FE specification, and therefore there is little to be gained from attempting the IV specification.

Table 4 only presents IV estimates for the ratio-form specification, using father and mother's lagged weekly working hours, or the difference between them as instruments.<sup>15</sup> The use of lagged variables should help mitigate concerns for the validity of the instruments.

*Insert table 4 here*

Both the over-identified and the exactly-identified models give very similar estimates which are also statistically significant at the 1% level. The magnitudes of the 2SLS estimates are 2-3 times as large as those from the corresponding FE estimates, consistent with the view that the latter can be regarded as lower bounds. The instruments are not only all individually significant at the 1% level, but also highly significant jointly. Only for girls in the over-identified model is the F-statistic for the excluded instruments marginally below the threshold of 10, indicating that these are not weak instruments. Whenever the model is over-identified, we can't even reject the validity of instruments at the 40% level.

Although the IV results should be only treated as tentative evidence, they nevertheless

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<sup>14</sup> The fact that the ratio-form specification is found to be significant in households with non-working mothers only, in comparison with household with working mothers, may indicate that in those households the specialization of household labor (Becker, 1965) is stronger, and participation of fathers in household tasks may be seen as exceptional by their children, having a higher influence.

<sup>15</sup> Empirically it is a great challenge to find a strong instrument which has as strong a correlation with the endogenous variable under consideration as possible but zero correlation with the error term. Hersch (1997, 2002) and Bryan and Sevilla (2011) all rely on a large set spousal and household characteristics such as spouse's labour market participation and hours of work, occupation and wages, as instruments for own housework time in the log wage equation. These instruments fail to pass the over-identification tests for some subgroups. Moreover, they might also suffer from the many-weak instruments problem which bias 2SLS towards OLS in finite samples (see e.g. Angrist and Pischke 2015).

lend further support to our preferred FE specification which can be regarded as the lower bound.<sup>16</sup>

## 5. Conclusions

Despite that inter-generational mobility has become an active research area in economics, there is still much work to do to identify how family issues operate and impact on inequality between generations. This paper attempts to bridge this gap by analyzing inter-generational transmission of behaviors at home with respect to time dedicated to housework.

Using data from the Multinational Time Use Study for the UK, we find positive correlations between parents' and children's housework time for the UK, as an increase of 10% in the time devoted to housework by fathers translate into an increase of around 1% and 2% in the time devoted to housework by boys, while an increase of 10% in the time devoted to housework by mothers translate into an increase of 1% and 1.4% in the time devoted to housework by girls. Using our preferred specification which focuses on the effect of the ratio of father-mother housework time on the child-mother housework time ratio, we find that a higher father-to-mother housework ratio is positively related with a higher child-to-mother housework ratio. But one limitation of this analysis is that our data is a cross-section of individuals, and it does not allow us to identify the effect of parents' housework time net of (permanent) individual heterogeneity in preferences. Also, other unobservable factors may be related to both parents and children's housework time. Thus, we cannot speak definitively about a causal relationship between parents and children's housework time.

Following previous recommendations (e.g., Gimenez-Nadal and Molina, 2013; 2014) we use an alternative dataset with a panel data structure with information on housework time. Using data from the British Household Panel Survey to account for permanent household unobserved heterogeneity, we find that only fathers' housework time appears to have a statistically significant effect. However, with short panels like ours, FE estimates are biased towards zero as a result of exacerbated measurement errors. When

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<sup>16</sup> Both our FE and IV results still hold, and indeed become more pronounced for girls, when we exclude families with a child younger than 12 (results available upon request). This implies that our findings are not driven by the differential parental input into childcare.

parental housework time are instrumented using father and mother's lagged weekly working hours or the difference between them, we find the IV estimates are not only highly statistically significant, but also of a magnitude more in line with those from the time use data.

Of the three main possible channels that explain intergeneration transmission of housework time, the fact that there appears to be substantial correlation of housework time observed when aged 16-18 and when the same respondents were observed in their late 20s in the BHPS suggests that imitation may not be the main channel. Furthermore, we observe a high positive correlation between parents and children's attitudinal questions (e.g., All in all, family life suffers when the woman has a full-time job; A husband's job is to earn money; a wife's job is to look after the home and family; Both husband and wife should contribute to household income) that have been related to be representative of gender roles attitudes (Scott, 2008), which has also been shown to be associated with the domestic division of labour in Britain (Crompton et al., 2005). All this evidence may indicate that gender roles and gender identity could be transmitted from parents to children according to a parental role model (Akerlof and Kranton, 2000), although more research on this issue is needed as this evidence is suggestive.

Our results may be helpful for targeting public policies towards greater gender equality. In particular, and given the reported gender gap in housework time in the UK (Gimenez-Nadal and Sevilla, 2012), policies aimed at increasing the participation of fathers in housework may foster a greater gender equality in housework time in the future. This issue is important because adolescents and young people have been identified as target groups for policies to eliminate gender inequality (United Nations Millennium Project, 2010). Ignoring such effects may lead to the suboptimal design or use of these policies.

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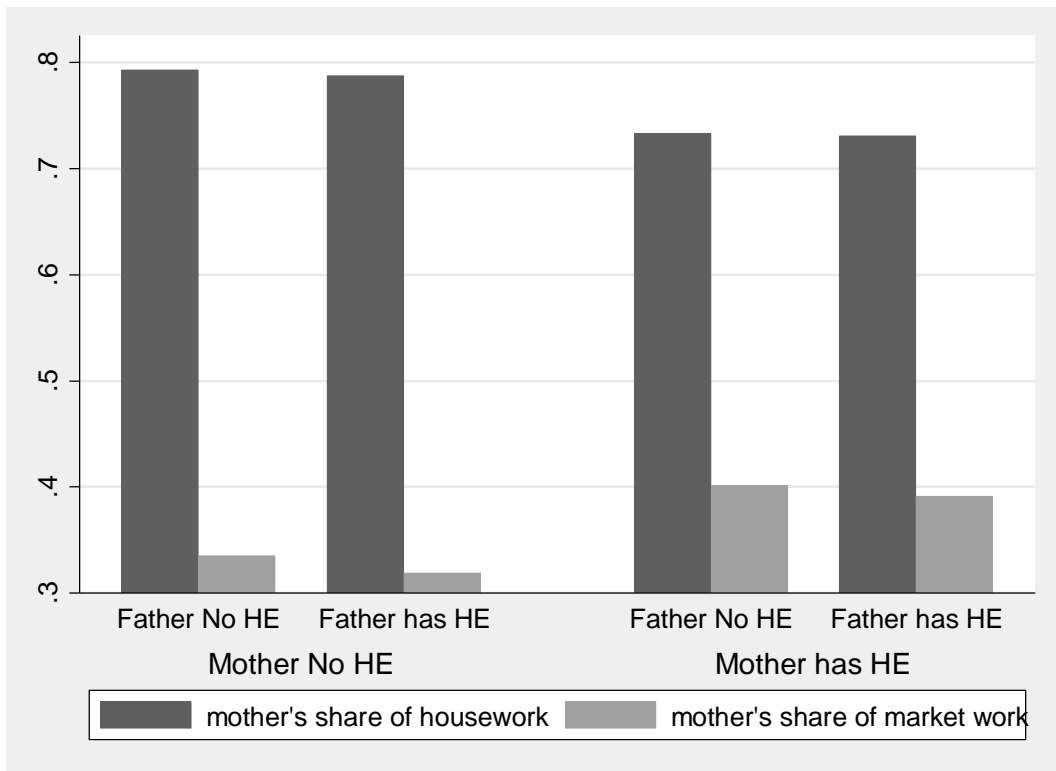
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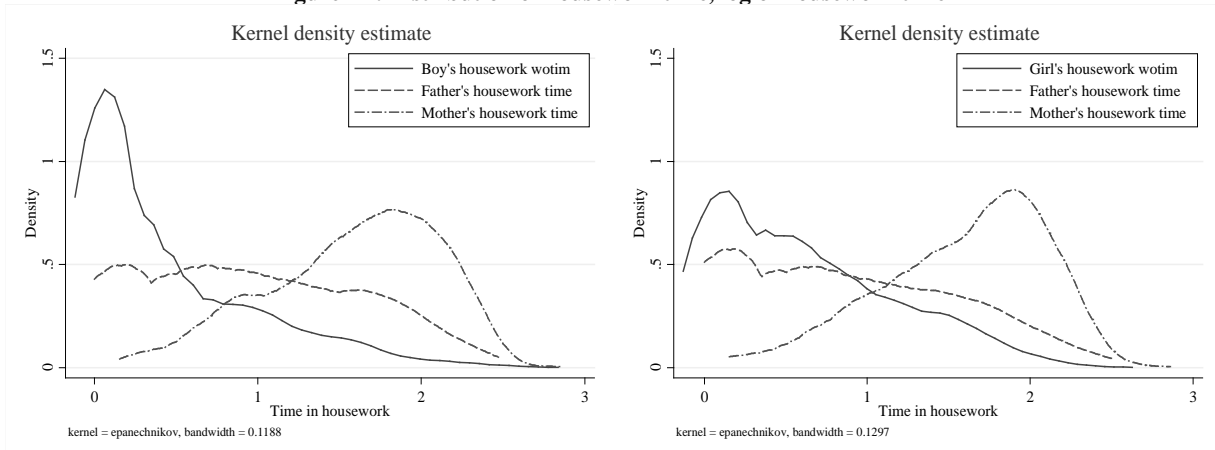
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Figure 1. Mother's share of housework and market work by education level, BHPS sample

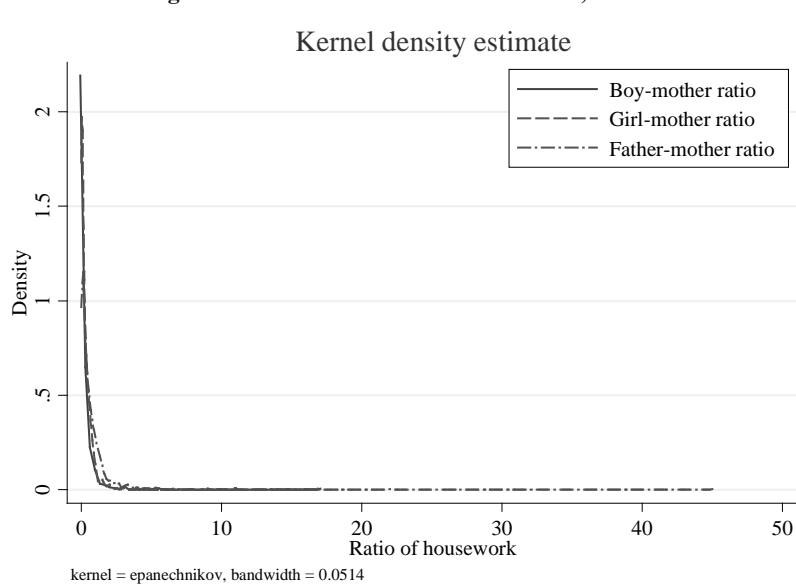


**Figure 2A. Distribution of housework time, log of housework time**



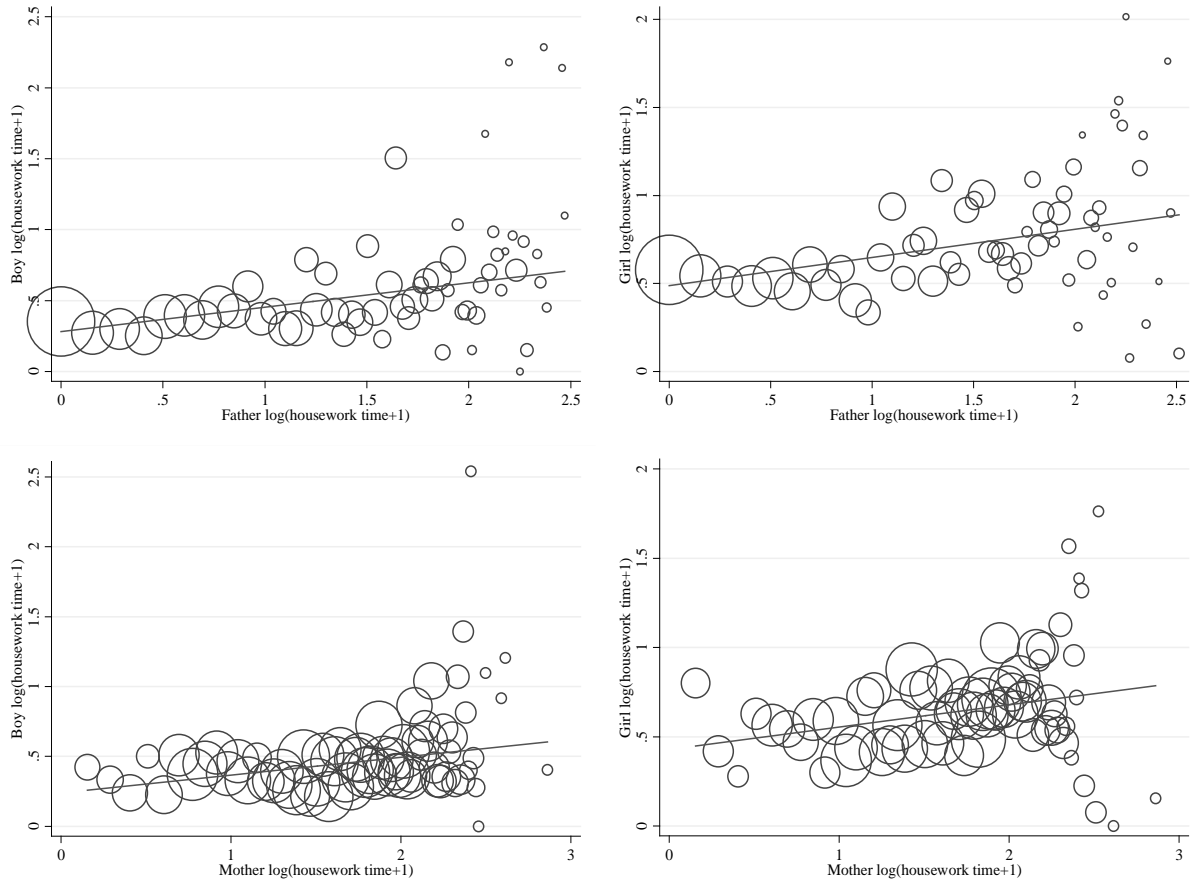
*Note:* Sample consists of individuals who are between 11 and 18 years old, who are reported as being a child in the household, and living with two heterosexual parents from the UK. We include parents of those children. Housework includes the total time devoted to the following activities: “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel”, and is measured in hours per day.

**Figure 2B. Distribution of housework time, ratios**



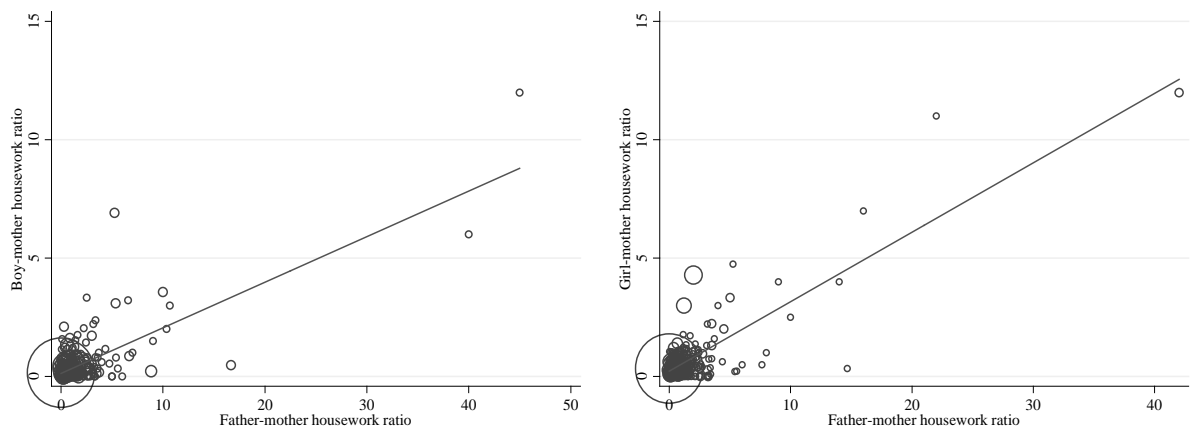
*Note:* Sample consists of individuals who are between 11 and 18 years old, who are reported as being a child in the household, and living with two heterosexual parents from the UK. We include parents of those children. Housework includes the total time devoted to the following activities: “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel”, and is measured in hours per day.

**Figure 3A. Mean time devoted to non-market work, parents and children, total time**



*Note:* Sample consists of individuals who are between 11 and 18 years old, who are reported as being a child in the household, and living with two heterosexual parents from the UK. We include fathers of those children. Housework includes the total time devoted to the following activities: “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel”, and is measured in hours per day.

**Figure 3B. Mean time devoted to non-market work, parents and children, ratios**



*Note:* Sample consists of individuals who are between 11 and 18 years old, who are reported as being a child in the household, and living with two heterosexual parents from the UK. We include fathers of those children. Housework includes the total time devoted to the following activities: “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel”, and is measured in hours per day.

**Table 1. Analysis of the United Kingdom Time Use Survey (2000)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(boy's housework time + 1)		Log(girl's housework's time + 1)		Boy/mother housework ratio		Girl/mother housework ratio	
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Log(father's housework time + 1)	0.124*** (0.035)	0.208*** (0.040)	0.084** (0.033)	0.074* (0.043)	-	-	-	-
Log(mother's housework time + 1)	0.100** (0.039)	0.091* (0.049)	0.097** (0.046)	0.142** (0.056)	-	-	-	-
Father/Mother housework ratio	-	-	-	-	0.200*** (0.039)	0.221*** (0.015)	0.308*** (0.041)	0.302*** (0.021)
Young Person's age	0.005 (0.013)	-	0.031** (0.014)	-	0.041* (0.022)	-	0.039* (0.020)	-
Young Person is student	0.101 (0.094)	-	-0.026 (0.088)	-	0.018 (0.102)	-	-0.320 (0.229)	-
Young Person is unemployed	0.381** (0.189)	-	-0.082 (0.169)	-	0.198 (0.189)	-	-0.390* (0.209)	-
Young Person working full/part-time	-0.015 (0.089)	-	-0.225*** (0.086)	-	-0.115 (0.146)	-	-0.195** (0.093)	-
Father secondary education	-0.021 (0.061)	-	0.068 (0.053)	-	-0.127 (0.115)	-	0.121 (0.100)	-
Mother secondary education	0.064 (0.053)	-	-0.016 (0.052)	-	0.086 (0.100)	-	-0.052 (0.114)	-
Father higher education	-0.093 (0.063)	-	0.063 (0.061)	-	-0.134 (0.119)	-	0.222 (0.181)	-
Mother higher education	0.036 (0.059)	-	-0.075 (0.060)	-	0.003 (0.067)	-	-0.181 (0.157)	-
Father's age	0.004 (0.004)	-	-0.006 (0.004)	-	0.001 (0.005)	-	-0.007 (0.010)	-
Mother's age at date of interview	0.001 (0.005)	-	0.000 (0.006)	-	0.000 (0.006)	-	-0.013 (0.013)	-
Father working full/part-time	-0.023 (0.077)	-	0.082 (0.060)	-	0.017 (0.084)	-	0.060 (0.072)	-
Mother working full/part-time	0.130** (0.052)	-	0.061 (0.060)	-	0.154** (0.073)	-	0.095 (0.075)	-
Number of people in household	-0.013 (0.023)	-	0.001 (0.023)	-	-0.041 (0.026)	-	0.027 (0.031)	-
Number of children in household	-0.013 (0.009)	-	0.011 (0.008)	-	-0.026*** (0.010)	-	0.027** (0.012)	-
Household owns dwelling	0.029 (0.060)	-	0.086 (0.059)	-	0.113 (0.091)	-	0.110 (0.086)	-
Constant	0.031 (0.246)	0.237** (0.101)	0.228 (0.269)	0.640*** (0.110)	-0.086 (0.283)	0.244*** (0.062)	0.224 (0.275)	0.384*** (0.092)
Day Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Fixed-Effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	894	894	853	853	894	894	853	853
R-Squared	0.109	0.156	0.128	0.211	0.325	0.355	0.318	0.347

Notes. Robust standard errors clustered at the household level in parenthesis for Columns (1), (3), (5) and (7). The sample is restricted to children who are between 11 and 18 years old, and living with two heterosexual parents from the UK. Columns (1) and (5), and (3) and (7) present results of OLS models for boys and girls, respectively, Columns (2) and (6), and (4) and (8) present results of a FE model for boys and girls, respectively. Housework is measured in hours per day, and is defined as the sum of the time devoted to “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel.” \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



**Table 2: Analysis of the British Household Panel Survey (1992-2008)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(boy's housework time + 1)		Log(girl's housework's time + 1)		Boy/mother housework ratio		Girl/mother housework ratio	
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
<b>Log(father's housework time + 1)</b>	0.093***	0.046*	0.064***	0.036	-	-	-	-
	-0.019	-0.026	-0.021	-0.030	-	-	-	-
<b>Log(mother's housework time + 1)</b>	-0.038**	-0.005	0.014	0.005	-	-	-	-
	-0.017	-0.024	-0.020	-0.025	-	-	-	-
<b>Father/Mother housework ratio</b>	-	-	-	-	0.121***	0.086***	0.095***	0.101*
	-	-	-	-	(0.028)	(0.015)	(0.019)	(0.059)
<b>Young Person's age</b>	0.010*	-0.025	0.026***	-0.038	0.014	0.003	0.027***	-0.024
	(0.006)	-0.028	(0.007)	-0.028	(0.009)	-0.036	(0.009)	-0.043
<b>Young Person is student</b>	0.017	0.017	-0.042	-0.039	-0.064	-0.001	-0.021	-0.003
	(0.029)	-0.033	(0.035)	-0.037	(0.057)	-0.051	(0.031)	-0.042
<b>Young Person is unemployed</b>	0.043	0.089**	0.190***	0.159***	-0.074	-0.053	0.216***	0.184**
	(0.038)	-0.041	(0.057)	-0.058	(0.066)	-0.082	(0.065)	-0.076
<b>Young Person working full/part-time</b>	-0.012	0.002	-0.062*	-0.065	-0.081	-0.024	-0.051	-0.055
	(0.030)	-0.032	(0.036)	-0.040	(0.058)	-0.047	(0.032)	-0.042
<b>Father secondary education</b>	-0.008	0.099	-0.017	0.030	0.010	0.040	-0.008	-0.086
	(0.021)	-0.149	(0.022)	-0.064	(0.024)	-0.098	(0.019)	-0.079
<b>Mother secondary education</b>	-0.001	-0.054	0.004	-0.098	-0.006	-0.006	0.001	-0.102
	(0.019)	-0.044	(0.020)	-0.079	(0.023)	-0.073	(0.019)	-0.153
<b>Father higher education</b>	0.013	0.084	-0.002	-0.044	0.029	0.026	0.028	-0.127*
	(0.020)	-0.126	(0.020)	-0.051	(0.022)	-0.084	(0.019)	-0.074
<b>Mother higher education</b>	0.003	-0.010	0.008	-0.118*	0.007	0.003	0.004	-0.133
	(0.019)	-0.043	(0.020)	-0.061	(0.024)	-0.056	(0.021)	-0.104
<b>Father's age</b>	0.003	0.021	0.004	0.042	-0.002	-0.009	0.000	0.020
	(0.002)	-0.028	(0.003)	-0.026	(0.002)	-0.039	(0.002)	-0.038
<b>Mother's age at date of interview</b>	-0.005**	0.031	-0.005*	0.022	-0.002	-0.013	-0.001	0.039
	(0.002)	-0.025	(0.003)	-0.025	(0.003)	-0.031	(0.003)	-0.028
<b>Father working full/part-time</b>	0.028	-0.010	0.016	0.052	0.030	-0.015	0.018	0.037
	(0.025)	-0.031	(0.028)	-0.046	(0.037)	-0.030	(0.033)	-0.066
<b>Mother working full/part-time</b>	0.005	0.011	0.017	0.040	0.019	0.028	0.033	0.092**
	(0.019)	-0.025	(0.022)	-0.029	(0.028)	-0.021	(0.025)	-0.043
<b>Number of people in household</b>	0.028**	0.041**	0.026**	0.021	0.018	0.021	-0.004	0.004
	(0.011)	-0.020	(0.011)	-0.020	(0.015)	-0.030	(0.010)	-0.028
<b>Number of children in household</b>	-0.026**	0.002	-0.017	-0.039*	-0.029**	0.063*	-0.013	0.020
	(0.012)	-0.018	(0.013)	-0.022	(0.014)	-0.032	(0.012)	-0.045
<b>Household owns dwelling</b>	0.014	0.041	-0.033	0.031	-0.010	0.035	-0.033	0.015
	(0.023)	-0.042	(0.026)	-0.062	(0.030)	-0.030	(0.023)	-0.062
<b>Wave Indicator</b>	(0.000)	-0.013	0.003**	0.004	0.003*	0.055	0.004**	0.009
	(0.001)	-0.028	(0.002)	-0.034	(0.002)	-0.037	(0.002)	-0.036
<b>Constant</b>	-0.014	-1.857*	-0.208	-2.097*	-0.039	0.280	-0.296*	-2.149*
	(0.130)	(1.006)	(0.144)	(1.146)	(0.168)	(1.480)	(0.157)	(1.216)
<b>Household Fixed Effects</b>	No	Yes	No	Yes	No	Yes	No	Yes
<b>Observations</b>	2,270	2,270	2,409	2,409	2,270	2,270	2,409	2,409
<b>R-Squared</b>	0.05	0.027	0.058	0.066	0.222	0.098	0.18	0.117

Note: Robust standard errors clustered at the household level in parentheses. The sample is restricted to children who are between 16 and 18 years old, and living with two heterosexual parents from the UK. Columns (1) and (5), and (3) and (7) present results of OLS models for boys and girls, respectively, Columns (2) and (6), and (4) and (8) present results of a FE model for boys and girls, respectively. Housework time variables constructed from the question "About how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry?". \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 3, FE Heterogeneous effects**

<b>Panel A: Mother working</b>				
Dep var:	(1)	(2)	(3)	(4)
	Log of (youth's housework time+1)		Child-mother housework ratio	
	Boy	Girl	Boy	Girl
Log of (father's housework time+1)	0.054*	0.042		
	(0.029)	(0.033)		
Log of (mother's housework time+1)	0.032	0.020		
	(0.029)	(0.029)		
father-mother housework ratio			0.058	0.069
			(0.048)	(0.052)
Observations	1757	1868	1757	1868
R <sup>2</sup>	0.025	0.078	0.031	0.086
<b>Panel B: Mother not working</b>				
Log of (father's housework time+1)	0.041	-0.005		
	(0.049)	(0.075)		
Log of (mother's housework time+1)	0.004	-0.019		
	(0.043)	(0.062)		
father-mother housework ratio			0.093***	0.475*
			(0.016)	(0.241)
Observations	513	541	513	541
R <sup>2</sup>	0.131	0.109	0.291	0.255
<b>Panel C: Mother without higher qualifications</b>				
Log of (father's housework time+1)	0.029	0.067*		
	(0.030)	(0.036)		
Log of (mother's housework time+1)	-0.041	0.007		
	(0.029)	(0.032)		
father-mother housework ratio			0.097***	0.060
			(0.018)	(0.055)
Observations	1434	1549	1434	1549
R <sup>2</sup>	0.051	0.087	0.186	0.137
<b>Panel D: Mother with higher qualifications</b>				
Log of (father's housework time+1)	0.089*	-0.008		
	(0.049)	(0.052)		
Log of (mother's housework time+1)	0.088**	-0.003		
	(0.043)	(0.040)		
father-mother housework ratio			0.002	0.223***
			(0.091)	(0.050)
Observations	836	860	836	860
R <sup>2</sup>	0.037	0.108	0.030	0.219

Note: Robust standard errors clustered at the household level in parentheses. The sample is restricted to children who are between 16 and 18 years old, and living with two heterosexual parents from the UK. Housework time variables constructed from the question "About how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry?".  
\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4: IV estimates for the ratio-specification**

	(1)	(2)	(3)	(4)
	Boys		Girls	
	Child-mother housework ratio	Child-mother housework ratio	Child-mother housework ratio	Child-mother housework ratio
father-mother housework ratio	0.194*** (0.037)	0.202*** (0.038)	0.276*** (0.073)	0.289*** (0.072)
<i>Hansen J statistic</i> $\chi^2(1)$ ( <i>p-value</i> )	-	0.346 (0.557)	-	0.600 (0.439)
<b><i>First-stage: dep var = father-mother housework ratio</i></b>				
<b>Difference in Father and mother's lagged weekly working hours</b>	-0.0083*** (0.0011)		-0.0059*** (0.0014)	
<b>Father's lagged weekly working hours</b>		-0.0057*** (0.0016)		-0.0045*** (0.0014)
<b>Mother's lagged weekly working hours</b>		0.1217*** (0.0015)		0.0081*** (0.0021)
<i>F-test of excluded instruments</i> ( <i>p-value</i> )	51.94 (0.0000)	37.07 (0.0000)	17.60 (0.0000)	9.06 (0.0001)
Observations	2160	2160	2291	2291

Note: Robust standard errors clustered at the household level in parentheses. The sample is restricted to children who are between 16 and 18 years old, and living with two heterosexual parents from the UK. Housework time variables constructed from the question "About how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry?". \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# APPENDIX

Table A1: Sum Stats, UKTUS by gender of the child

	(1)		(2)		(3)		(4)
	Children		Boys		Girls		Diff Boy-Girl
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	
Child housework time (h. per day)	1.022	(1.517)	0.854	(1.499)	1.208	(1.517)	-0.354***
Father's housework time (h. per day)	2.112	(2.260)	2.207	(2.272)	2.008	(2.244)	0.200**
Mother's housework time (h. per day)	4.488	(2.523)	4.476	(2.560)	4.502	(2.483)	-0.026
Child/Mother housework ratio	0.385	(1.129)	0.310	(0.945)	0.467	(1.298)	-0.158***
Father/Mother housework ratio	0.883	(2.417)	0.946	(2.574)	0.812	(2.231)	0.134
Male	0.524	(0.500)	-	-	-	-	-
Young Person's age	14.294	(2.246)	14.326	(2.242)	14.259	(2.252)	0.068
Young Person is student	0.870	(0.336)	0.867	(0.340)	0.874	(0.332)	-0.007
Young Person is unemployed	0.028	(0.165)	0.030	(0.171)	0.026	(0.158)	0.005
Young Person working full/part-time	0.191	(0.393)	0.185	(0.388)	0.197	(0.398)	-0.012
Father secondary education	0.331	(0.471)	0.339	(0.474)	0.323	(0.468)	0.016
Mother secondary education	0.359	(0.480)	0.366	(0.482)	0.353	(0.478)	0.013
Father higher education	0.278	(0.448)	0.258	(0.438)	0.299	(0.458)	-0.041
Mother higher education	0.348	(0.476)	0.372	(0.484)	0.321	(0.467)	0.052**
Father's age	0.352	(0.478)	0.322	(0.468)	0.385	(0.487)	-0.062
Mother's age at date of interview	0.269	(0.444)	0.265	(0.441)	0.275	(0.447)	-0.010
Father working full/part-time	44.526	(6.843)	44.711	(6.928)	44.322	(6.747)	0.389
Mother working full/part-time	42.210	(5.755)	42.376	(5.833)	42.028	(5.666)	0.348
Number of people in household	0.848	(0.359)	0.834	(0.373)	0.864	(0.343)	-0.030†
Number of children in household	0.750	(0.433)	0.749	(0.434)	0.752	(0.432)	-0.003
Household owns dwelling	4.585	(1.187)	4.582	(1.160)	4.589	(1.216)	-0.008
Young Person's age	11.152	(4.199)	11.128	(4.186)	11.179	(4.215)	-0.051
Young Person is student	0.809	(0.393)	0.821	(0.384)	0.796	(0.404)	0.025
<b>Obs</b>	1,747		894		853		

Note: The sample is restricted to children who are between 11 and 18 years old, and living with two heterosexual parents from the UK. Housework is measured in hours per day, and is defined as the sum of the time devoted to “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel”. †: \*, \*\* and \*\*\* indicate statistical significance of the means for a two-sided test at the 10%, 5% and 1% level respectively.

**Table A2: Analysis of the United Kingdom Time Use Survey (2000), heterogeneous effects**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(boy's housework time + 1)	Log(girl's housework's time + 1)	Log(girl's housework's time + 1)	Boy/mother housework ratio	Boy/mother housework ratio	Girl/mother housework ratio	Girl/mother housework ratio	
					OLS	FE	OLS	FE
<b>Panel A: Mother working PT/FT</b>								
Log(father's housework time + 1)	0.106** (0.043)	0.187*** (0.049)	0.076** (0.038)	0.068 (0.050)	- -	- -	- -	- -
Log(mother's housework time + 1)	0.088* (0.047)	0.120** (0.057)	0.109** (0.054)	0.162** (0.064)	- -	- -	- -	- -
Father/Mother housework ratio	- -	- -	- -	- -	0.226*** (0.033)	0.224*** (0.017)	0.315*** (0.044)	0.304*** (0.025)
Observations	658	658	643	643	658	658	643	643
R-Squared	0.103	0.161	0.14	0.234	0.363	0.38	0.318	0.347
<b>Panel B: Mother not-working</b>								
Log(father's housework time + 1)	0.210*** (0.054)	0.258*** (0.074)	0.093 (0.072)	0.092 (0.088)	- -	- -	- -	- -
Log(mother's housework time + 1)	0.108 (0.070)	-0.004 (0.111)	0.049 (0.095)	0.080 (0.130)	- -	- -	- -	- -
Father/Mother housework ratio	- -	- -	- -	- -	0.069*** (0.024)	0.137** (0.053)	0.239*** (0.030)	0.248*** (0.033)
Observations	236	236	210	210	236	236	210	210
R-Squared	0.215	0.193	0.179	0.182	0.21	0.154	0.481	0.426
<b>Panel C: Mother without higher qualification</b>								
Log(father's housework time + 1)	0.111*** (0.039)	0.216*** (0.048)	0.075* (0.039)	0.038 (0.050)	- -	- -	- -	- -
Log(mother's housework time + 1)	0.069 (0.044)	0.060 (0.059)	0.035 (0.056)	0.077 (0.070)	- -	- -	- -	- -
Father/Mother housework ratio	- -	- -	- -	- -	0.215*** (0.045)	0.265*** (0.021)	0.302*** (0.050)	0.293*** (0.026)
Observations	622	622	603	603	622	622	603	603
R-Squared	0.095	0.152	0.117	0.165	0.331	0.372	0.284	0.329
<b>Panel D: Mother with higher qualification</b>								
Log(father's housework time + 1)	0.129* (0.067)	0.217** (0.094)	0.070 (0.068)	0.188** (0.091)	- -	- -	- -	- -
Log(mother's housework time + 1)	0.233** (0.093)	0.243** (0.120)	0.285*** (0.076)	0.256** (0.105)	- -	- -	- -	- -
Father/Mother housework ratio	- -	- -	- -	- -	0.140*** (0.009)	0.143*** (0.017)	0.362*** (0.041)	0.384*** (0.036)
Observations	233	233	232	232	233	233	232	232
R-Squared	0.28	0.19	0.266	0.399	0.465	0.48	0.656	0.569

*Notes.* Robust standard errors clustered at the boy/girl level in parenthesis for Columns (1), (3), (5) and (7). The sample is restricted to children who are between 11 and 18 years old, and living with two heterosexual parents from the UK. Columns (1) and (5), and (3) and (7) present results of OLS models for boys and girls, respectively, Columns (2) and (6), and (4) and (8) present results of a FE model for boys and girls, respectively. Housework is measured in hours per day, and is defined as the sum of the time devoted to “cook, wash up”, “housework”, “odd jobs”, “shopping” and “domestic travel.”

**Table A3, BHPS, Summary Statistics, by gender of the child**

	Boys	Girls	Difference <sup>†</sup>
<b>Child's daily housework hour</b>	0.289	0.442	-0.153***
<b>Father's daily housework hour</b>	0.811	0.732	0.079***
<b>Mother's daily housework hour</b>	2.950	2.917	0.034
<b>Young Person's age</b>	16.93	16.92	0.018
<b>Young Person is student</b>	0.604	0.696	-0.092***
<b>Young Person is unemployed</b>	0.060	0.037	0.023***
<b>Young Person working full/part-time</b>	0.286	0.221	0.065***
<b>Father secondary education</b>	0.254	0.282	-0.028**
<b>Mother secondary education</b>	0.321	0.325	-0.003
<b>Father higher education</b>	0.457	0.453	0.004
<b>Mother higher education</b>	0.368	0.357	0.011
<b>Father's age</b>	46.80	46.69	0.12
<b>Mother's age at date of interview</b>	44.68	44.54	0.14
<b>Father working full/part-time</b>	0.871	0.882	-0.010
<b>Mother working full/part-time</b>	0.777	0.777	0.000
<b>Number of people in household</b>	4.420	4.403	0.016
<b>Number of children in household</b>	0.777	0.774	0.002
<b>Household owns dwelling</b>	0.843	0.836	0.007
<b>Wave indicator (linear time trend)</b>	10.60	10.90	-0.30**
<b>Obs (person-waves)</b>	2,270	2,409	4,679
<b>Individuals</b>	1,052	1,092	

*Note:* Sample consists of individuals aged 16-18, who are living with both parents aged 60 or below, in all wave 2-18 of the BHPS. Housework time variables constructed from the question "About how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry?".

<sup>†</sup>: \*, \*\* and \*\*\* indicate statistical significance of the means for a two-sided test at the 10%, 5% and 1% level respectively.