



Measuring Gender Gaps in Time Allocation in Europe

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Abstract

This paper explores the gender gap in time allocation in European countries, offering a comparison of the 2000s and the 2010s, along with an explanation of the documented gender gaps, based on social norms and institutional factors. The results show that the gender gap in both paid and unpaid work has decreased in most countries, but with a significant level of cross-country heterogeneity in the size of the gender gaps. More traditional social norms are related to greater gender inequalities in paid and unpaid work, while countries with better family-friendly policies and a greater representation of women in politics and in the labour market exhibit smaller gender inequalities. This paper provides a comprehensive analysis of gender gaps in Europe, and attempts to monitor the progress towards the elimination of gender inequalities. Despite that some degree of gender convergence in paid and unpaid work has taken place, there remain inequalities in the distribution of labour in European countries, and possible solutions may be related to social norms and family-friendly policies.

Keywords Paid work · Unpaid work · Time allocation · Gender gap · Europe

1 Introduction

This paper analyzes the time men and women in European countries devote to paid and unpaid work, with a focus on the gender gaps in such work. The recent development of time use surveys has allowed for in-depth analysis of the determinants of the time-allocation decisions of individuals (Gershuny, 2000; Gauthier et al., 2004; Aguiar & Hurst, 2007;

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Gimenez-Nadal & Sevilla., 2012). One commonality found is that women, in general, devote relatively more time to household production than do men (Aguiar & Hurst, 2007; Aliaga, 2006; Fisher & Robinson, 2011; Gimenez-Nadal & Sevilla, 2012), concentrating on routine and more time-intensive unpaid work, such as cooking, cleaning, and caring for others (Grossbard et al., 2014; Sevilla et al., 2010). These patterns of specialization may be detrimental for women, who may perceive that their labour market opportunities are limited (e.g., by lower wages).

Despite the evolution of policies to eliminate gender inequalities, and combat gender-based discrimination, that have been expanded and integrated into primary and secondary law, significant gender inequalities persist.¹ Assessing the extent of the unequal gender division of paid and unpaid labour, and investigating its sources, is key to monitoring progress in redressing gender inequalities, given that differences in the time devoted by men and women to household work and care of others may spill over to the labour market and are an obstacle to equality of earnings (Bryan & Sevilla, 2010; Hersch & Stratton, 1994, 1997, 2002). Thus, the analysis of gender gaps mainly in unpaid work may help to identify priority areas for policy interventions.

Within this framework, we use data obtained from the Harmonized European Time Use Survey (HETUS) to analyze the gender gap in paid and unpaid work across European countries, focusing on the current status and its evolution in comparison to the previous decade.² It is shown that paid and unpaid work is still unequally distributed by gender across Europe, with significant cross-national differences pointing to the possibilities for transformative change. We observe significant differences by age in the hours of unpaid work by gender, across Europe and for all age groups, with those differences being the largest in absolute value for prime-age groups. Although gender gaps in paid and unpaid work have declined slightly in the 2010s in comparison to the 2000s, this may only be a temporary phenomenon, due to the recent economic crisis that hit men's jobs harder.

In the analysis of the driving forces behind the gender gaps in paid and unpaid work, we consider social norms and institutional conditions as factors influencing the paid and unpaid work hours of individuals. Using data from the European Values Study (EVS) and from institutional factors—such as paternity leave duration and family-friendly benefits—countries are compared in terms of the gender gaps in paid and unpaid work. We show that social norms about what men and women should and should not do are important in explaining the gender gaps, which can be interpreted as follows: in countries with less “traditional” social norms regarding the role of women in society, the gender gaps in both paid and unpaid work are smaller. Institutional factors are also related to these gender gaps, since they are smaller in countries with more generous family-friendly policies, and in countries with greater involvement of women in both the labour market and politics.

Our contribution to the literature is twofold. First, we offer updated evidence of gender gaps in paid and unpaid work in Europe and compare its evolution in the last two decades. We complement prior studies that have analyzed these gender gaps in Europe (Fisher

¹ The Sex Discrimination Act (SDA) and the L'Equal Pay Act were both launched in 1975 and are the first two anti-discrimination laws at the European level. Many countries have since launched their own laws for gender equality, as in Spain in 2007, and focused on topics such as gender violence, gender wage discrimination, higher female unemployment, the low presence of women in positions of political, social, cultural, and economic responsibility, and problems balancing work and family.

² The data released by EUROSTAT, obtained as part of the Harmonized European Time Use Survey (HETUS) project, is analyzed to show the average time devoted to paid work and unpaid work by men and women in a range of European countries.

& Robinson, 2011; Gauthier et al., 2004; Gimenez-Nadal & Sevilla, 2012) with the latest available time-use data. We show that, in comparison with the 2000s, the gender gaps have shrunk in the 2010s, although they remain substantial in certain countries. Second, we focus on social norms and institutional factors as driving forces shaping the gender gaps in paid and unpaid work, and we confirm prior evidence showing the importance of these factors in determining gender gaps in time allocation (Bettio & Plantenga, 2004; Campaña et al., 2018; Sevilla et al., 2010). Possible and potential strategies to reduce gender inequalities in work time may be related to social norms and family-friendly policies.

The rest of the paper is organized as follows. Section 2 presents a literature review of the factors affecting time allocation decisions, including social norms and institutional forces. Section 3 explains the data used in the analysis. Section 4 presents evidence of the gender gap in paid and unpaid work, and Sect. 5 analyzes the gender gaps over the life cycle. Section 6 proposes several explanations for the reported gender gaps, and Sect. 7 sets out our main conclusions.

2 Conceptual Framework and Literature Review

Several theories have been proposed to explain individual time allocation decisions. In the specialization model (Becker, 1991), the household is represented by a single utility function, and it is assumed that the main household earner (most often the husband), whose hourly wage is higher than that of the secondary earner in the household (most often the wife), should specialize in market work, while the secondary earner should specialize in unpaid work. Alternatives to this are found in the cooperative bargaining models (Manser & Brown, 1980; McElroy & Horney, 1981), non-cooperative bargaining models (Chen & Woolley, 2001; Lundberg & Pollak, 1993, 1996), and collective models (Browning & Chiappori, 1998; Chiappori, 1988, 1992), among others (see Himmelweit et al., 2013 for a review).

Prior literature has analyzed the time-allocation decisions of individuals for groups of countries, including Gershuny (2000), Fuwa (2004), Gauthier et al. (2004), Hook (2006, 2010), Burda et al. (2013), Fisher and Robinson (2011), Gimenez-Nadal and Sevilla (2012), and Hook and Wolfe (2012, 2013). These studies have consistently reported that while men devote more time to paid work activities, women devote more time to unpaid work and child care activities. Some of these analyses have also documented the existence of gender convergence in the uses of time (Gauthier et al., 2004; Gimenez-Nadal and Sevilla, 2012; Fang & McDaniel, 2016), as women have increased the time devoted to paid work in relation to men, and men have relatively increased the time devoted to unpaid work and childcare, despite that gender gaps in time allocations persist in most countries.

Among the potential drivers of the gender gap in paid and unpaid work, gender norms and institutional factors (e.g., availability of child-care services for children under age 3, generosity of parental leave policies) have been shown to be important in determining the time men and women devote to both paid and unpaid work. Social norms are what men and women should and should not do, and it has been shown that they are important in terms of the time devoted to paid and unpaid work, and in the gender gaps in the time devoted to these activities (Sevilla et al., 2010; Campaña et al., 2018). Gender norms have been shown to affect time allocation decisions (Burda et al., 2013; Seguino, 2007; Sevilla, 2010; Sevilla et al., 2010; Campaña et al., 2018), which can be reconciled with the fact

that “gender ideology” affects such decisions (Bittman et al., 2003; Hook, 2006; Bianchi & Milkie, 2010; Bertrand et al., 2015).

Furthermore, Bittman et al. (2003) find, for Australia, that it is the woman’s housework (not the man’s) that increases when she contributes more than 50% of household income. In comparing their results with those of the US studies, these authors conclude that men’s decrease in housework is small, in both countries, when women’s relative earnings are higher than 50% of the total, and it comes from the extreme tail of the men’s earnings distribution. However, Bittman et al. (2003) argue that the amount of housework done by a married woman increases in Australia—but not in the US—when she earns more than her husband, because institutional and cultural differences make women’s primary breadwinning more deviant in Australia than in the US. Several studies show that context (for example, the employment situation) can supersede gender ideology and is key to a variety of caregiving and household behaviors (Hook, 2006; Risman, 1998).

Institutional factors may also be related to gender gaps in paid and unpaid work. For example, European countries differ in their welfare regimes (Esping-Andersen, 1999), which is reflected in the share of the public budget allocated to providing elder and childcare. This notion has been further developed in the literature on European ‘care regimes’ (Bettio & Plantenga, 2004). Specifically, Nordic countries have a greater availability of public childcare services for children under age 3, and longer paternity and maternity leaves, in comparison with Mediterranean countries such as Spain and Italy (Boll et al., 2014; European Parliament, 2015; Fernandez-Crehuet et al., 2016).

Differences in the duration of parental leave, and the replacement rate of parental leave benefits to earnings, which are about 100 per cent in Scandinavian countries, or the availability and opening times of kindergartens for children under age 3 and for those aged 3–6, all alleviate the informal care burden of parents, and may help reduce imbalances in the allocation of time by gender. Gálvez-Muñoz et al., (2011) find that different patterns of time distribution persist among various groups of countries, relating such variations to cross-country differences in welfare systems and family policies, especially those established some decades ago, and between Western and Eastern Europe. Such differences continue to affect women’s ability to develop their personal capabilities, including their ability to enter the labour market on equal terms with men.

Unequal sharing of household responsibilities may impose an extra burden on working mothers with children (Gimenez-Nadal and Sevilla, 2011; Gimenez-Nadal & Molina, 2016), and may lead to women having more difficulty than men in accessing certain jobs, developing their careers, or gaining promotion to decision-making positions. This may add to the so-called “glass ceiling” phenomenon, that attributes to employer discrimination the fact that fewer women are found in top positions. Furthermore, women may take jobs with inferior working conditions (i.e., lower pay or with fewer contracted working hours) than men, to be able to balance their work and household responsibilities. Some European countries succeed better than others in promulgating policies aimed at facilitating women’s access to the labour market and to top managerial positions (such as the “quotas” introduced in Norway, that reserve a certain number of company board positions to women).

Other factors affecting time allocation decisions are related to socio-demographic characteristics. For instance, the gender gap in time devoted to total work (e.g., sum of paid and unpaid work, including childcare) varies dramatically by family type. When couples have preschool-age children and both men and women are employed full-time, women’s total

Table 1 Paid work participation rates

Country (2010)	Men	Women
Austria	50.5	36.6
Belgium	33.1	25.9
Estonia	37.9	32.1
Finland	36.1	30.2
France	41.4	30.5
Germany	41.3	31.1
Greece	36.4	22.8
Hungary	39.0	28.0
Italy	46.5	25.8
Luxembourg	48.3	37.8
Netherlands	44.6	31.0
Norway	46.1	36.2
Poland	46.9	29.3
Romania	49.0	33.8
Serbia	47.0	30.9
Spain	40.7	29.5
United Kingdom	43.8	32.3
Average	42.9	30.8

The Sample (Eurostat TUS) has been restricted to countries with available data for the year 2010 and includes the population of all ages

work is higher than that of men, and women's excess total work is even higher in unconventional families, where men are not employed full-time (Sayer et al., 2009).

Other variables related to individual time allocation decisions include labour market factors, such as taxes (Bick & Fuchs-Schündlen, 2017; Duernecker & Herrendorf, 2018; Gelber & Mitchell, 2012; Ragan, 2013), and earnings (Gupta, 2007), and job characteristics, such as weekly work hours (Bianchi et al., 2000, 2012; Coltrane, 2000; Lachance-Grzela & Bouchard, 2010) and non-standard work timing (Hewitt et al., 2012; Silver & Goldscheider, 1994).

3 Data and Variables

We use aggregated data from the 2000s and 2010s waves of the Harmonized European Time Use Survey (HETUS), offered by Eurostat. The HETUS project aims to offer guidelines to countries on how to design their time use surveys, with the main aim of making these surveys comparable. As a result, countries that follow the HETUS project follow the same data-collection format and use a similar questionnaire, where time diaries are given to a representative sample of the population in each of the participant countries.³ The rich

³ Several countries participated in the HETUS, including a range of EU Member countries, as well as some non-Member States and candidate countries. Table 4 in "Appendix 1" summarizes the participating countries and the year in which the respective surveys took place. This paper considers the countries participating in the HETUS only, excluding Turkey (results using Turkey are robust and available upon request).

data provides detailed and precise information on the time spent on paid work and unpaid work, ensuring comparability across a range of European countries, thanks to the statistical offices of member countries and Eurostat that have invested considerable resources to harmonize each national time-use survey questionnaire.

For each country, a time use diary was given to a random and representative sample of the population, and participants noted their activities throughout the full 24-h day. Main activities were the focus of the diary, though some country time-use surveys also asked about “secondary activities”, to reflect the fact that respondents may be doing several activities at one time, i.e., “multi-tasking”; Bianchi et al. (2000), Sayer, (2007).⁴ The HETUS surveys collected time use diaries for all days of the week, and all months of the year. The surveys are “cross-sectional”, with each respondent being interviewed only once. Despite that time use surveys gather information for only one diary day, or two at the most, viable long-term estimates can be made using these surveys (Gershuny, 2012).

It is important to note that the information provided by Eurostat is aggregated at the country level, since Eurostat does not provide access to the micro-databases, and only aggregated tables at the country level are available. The Statistical Offices of each country compute the time devoted to the different activities, using weighting procedures that ensure the information is representative of the country, and then send this information to Eurostat. Therefore, we do not need to compute any averages at the country level. The information is given with three main indicators, the “time spent” in activities, the “participation rate”, and the “participation time”. *Time spent* is defined as the mean time spent on the activities by all individuals, computed by categories predefined in the Eurostat tables, while *participation time* is defined as mean time spent in the activities by those individuals who took part in the activity. Throughout the paper we use averages by gender and age. Other available categories are, for instance, household composition, education attained, and the self-declared labour status.⁵

The aggregated tables provided by Eurostat are restricted to men and women who are 15 years old and over. However, for paid work, we focus on participation times, that is, the time devoted to paid work by those who participate in the activity, and thus this analysis automatically excludes non-working individuals, including 15-year-olds, 65 and older individuals, students, retired, unemployed, disabled, and other non-working individuals. Our analysis focuses on the time spent on paid and unpaid work by both men and women. Paid work is defined as the time devoted to main job, second job, and employment-related activities, excluding commuting, following the existing literature (Aguiar & Hurst, 2007; Gimenez-Nadal & Sevilla, 2012). Unpaid work is defined as the time devoted to household

⁴ The consideration of simultaneous or “secondary” activities has been found to increase the total amount of time dedicated to household production (Kalenkoski and Foster, 2015) and is also important in gender comparisons, given that there may be gender differences in the ability to carry out, and the need for, multi-tasking (Kalenkoski and Foster, 2016). In our case, the analysis of the time devoted to paid work and unpaid work refers to main activities only, which is a limitation, given that we cannot have a complete view of the gender gap in paid and unpaid work, since women are typically multi-tasking much more often than men. Furthermore, the analysis based on main activities does not take into account that, in some situations, despite that the diarist does not report childcare as main activity, he/she may be supervising children, and the analysis of total time in childcare as “main activity” thus underestimates the total time spent with children (Folbre and Yoon, 2007), especially for women (Kalil et al., 2012).

⁵ Details regarding data description, classification, coverage sector, statistical concepts, definitions, statistical units, statistical population, reference area, and coverage can be found at https://ec.europa.eu/eurostat/cache/metadata/en/tus_esms.htm. The data used in this paper comes from https://ec.europa.eu/eurostat/data/database?node_code=tus.

production, which includes cooking, ironing, shopping, and so on, as well as childcare and adult care activities. We focus on the average time devoted to both paid and unpaid work by men and women in the various countries in the HETUS. From Eurostat tables, we define our variables of interest, which are the average time devoted to paid or unpaid work.

3.1 Ancillary Data

In the analysis of the possible factors contributing to the gender gap in paid and unpaid work, several ancillary datasets are used. The first of these is the European Values Study, (EVS), a large-scale, cross-national, longitudinal research program on basic human values. It provides insights into the ideas, beliefs, preferences, attitudes, values, and opinions of citizens across Europe. It is a unique research project into how Europeans think about life, family, work, religion, politics, and society. The EVS began in 1981, when a thousand citizens in the European Member States of that time were interviewed, using standardized questionnaires. Every nine years, the survey is repeated in a varying number of countries. The fourth wave, from 2008, covers 47 European countries/regions, from Iceland to Georgia and from Portugal to Norway. In total, about 70,000 individuals in Europe are interviewed each year. A rich academic literature has been created around the original and subsequent surveys, and many other works have made use of the findings (more than 1600 publications are listed in the EVS Bibliography).

We use data from the waves of the EVS that are closest to those of the time use surveys we consider here: the EVS of 1999 and 2008. We exploit subjective answers by Europeans to questions regarding the roles of men and women in society concerning market work and household responsibilities. For this purpose, we select 7 questions from the EVS that can measure gender norms: (1) A working mother can establish just as warm and secure a relationship with her children as a mother who does not work (Indicator 1); (2) A pre-school child is likely to suffer if his or her mother works (Indicator 2); (3) A job is alright but what most women really want is a home and children (Indicator 3); (4) Being a housewife is just as fulfilling as working for pay (Indicator 4); (5) Having a job is the best way for a woman to be independent (Indicator 5); (6) Both husband and wife should contribute to the household income (Indicator 6); and (7) In general, fathers are as well suited to look after their children as mothers (Indicator 7).

Questions 1, 5, 6, and 7 may capture somewhat less “traditional” social norms, as they gauge whether the survey participant agrees with the idea that women can participate in the labour market, or that they ought to be economically independent, or that both men and women should have similar roles within the household. A higher level of agreement with these statements may reflect a higher level of equality of the roles of men and women in society. Attitudinal questions 2, 3, and 4 reflect more “traditional” social norms, as they characterize the main role of women as being care providers. There are four possible responses to each question (1 = strongly agree, 2 = agree, 3 = disagree, 4 = disagree strongly). We record the values as follows: for questions 1, 5, 6 and 7 the value “0” represents the options “disagree” and “strongly disagree”, while value “1” represents the options “strongly agree” and “agree”, and for questions 2, 3 and 4 the value “0” represents the

options “agree” and “strongly agree” while value “1” represents the options “strongly disagree” and “disagree”. Thanks to this recoding, higher values in the 7 questions can be consistently interpreted as signaling less traditional social norms.⁶

The seven questions are combined into a single *Neutral Index*, using the Principal Components Analysis (PCA) technique to weight the different components (Fernandez-Crehuet et al., 2016, 2017; Nardo et al., 2008). In this analysis, the first Principal Component is extracted, and the factor loadings are used as weights for the questions. Using this methodology, the weights assigned to each indicator are 0.39 for Indicator 1, 0.47 for Indicator 2, 0.40 for Indicator 3, 0.33 for Indicator 4, 0.38 for Indicator 5, 0.30 for Indicator 6, and 0.37 for Indicator 7. The countries with survey participant responses that gave, on average, higher values to these questions—and thus indicate less “traditional” social norms—are Finland, the Netherlands, United Kingdom, and Norway. In contrast, the countries in which survey participants answered, on average, with lower values of these questions—and thus indicate more “traditional” social norms—are Greece, Italy, Romania and Poland.⁷

For the analysis of institutional factors, the following variables are considered: (1) Public spending on families (cash), (2) Public spending on families (services), (3) Public spending on parental leave, (4) Maternity leave, (5) Paternity leave, (6) Maternity paid weeks, (7) Paternity paid weeks, (8) HDI (Human Development Index), (9) GDI (Gender Development Index), (10) GII (Gender Inequality Index), (11) Positions held by women in senior management, and (12) Seats held by women in national parliaments and governments. See “Appendix 3” for a full description of the variables and the source of information for each variable, and Table 8 for more details of these variables, and the countries and years considered.

4 The Gender Gap in Paid and Unpaid Work

To assess the gender gap in paid and unpaid work in the 2010s, we begin by analysing the time spent in paid work by men and women. Since Eurostat gives aggregated information on paid work participation times (i.e., the average time spent in paid work, restricted to individuals who report positive paid work time), this analysis is automatically restricted to workers. Figure 1 depicts the average hours worked, by gender, in each European country for which 2010 HETUS data are available. The first thing to notice is that the average worked by European women is about 6.6 h per day, compared to 7.7 h for European men. Hence, the difference in paid work between men and women in European countries amounts to over 1 h per day, on average, with male workers devoting more time to paid work than their female counterparts.

Countries in Fig. 1 are sorted in terms of the gender gap in paid work hours. Figure 1 shows which countries are more or less egalitarian in terms of the gender gap in paid work. For instance, as shown in Panel B of Fig. 1, the largest gender gap is found in Austria, where male workers devote about 8.4 h to paid work activities, vs 6.9 h by female workers. Thus, the time spent working by women is about 82% of the time spent working by men (a difference of 18%). The second largest percentage gap is estimated in the Netherlands

⁶ Table 6 in the Appendix shows the correlation matrix of these 7 attitudes. It can be seen that all the attitudinal questions are positively related, so that higher values of each question can be interpreted as a less traditional attitude.

⁷ Results of the PCA are available upon request. See Table 7, in “Appendix 3”, showing the values for each variable and the aggregate index for all the population.

Table 2 Multi-level estimates—paid and unpaid work gaps, and attitudes/social norms

	(1)	(2)	(3)
	Paid work gap (workers)	Unpaid work gap (all sample)	N. obs
<i>Indicator 1</i>	0.015***	− 0.176**	26
(A working mother can establish just as warm and secure a relationship with her children as a mother who does not work)	(0.004)	(0.083)	
R-squared	0.193	0.161	
<i>Indicator 2</i>	0.009*	− 0.264***	26
(A pre-school child is likely to suffer if his or her mother works)	(0.005)	(0.070)	
R-squared	0.072	0.360	
<i>Indicator 3</i>	− 0.007	− 0.197***	26
(A job is alright but what most women really want is home and children)	(0.007)	(0.070)	
R-squared	0.043	0.200	
<i>Indicator 4</i>	0.009**	− 0.115*	26
(Being a housewife is just as fulfilling as working for pay)	(0.004)	(0.068)	
R-squared	0.076	0.068	
<i>Indicator 5</i>	0.002	− 0.111**	26
(Having a job is best way for a woman to be Independent)	(0.006)	(0.048)	
R-squared	0.002	0.064	
<i>Indicator 6</i>	− 0.010**	− 0.114**	26
(Both the husband and wife should contribute to the household Income)	(0.004)	(0.050)	
R-squared	0.097	0.068	
<i>Indicator 7</i>	0.001	− 0.240***	26
(In general, fathers are as well suited to look after their children as mothers)	(0.006)	(0.068)	
R-squared	0.001	0.297	
<i>Neutral index</i>	0.004	− 0.264***	26
	(0.006)	(0.065)	
R-squared	0.016	0.361	

Robust standard errors in parentheses. The Sample (Eurostat TUS) has been restricted to countries with available data for the years 2000 and 2010, and available data in the European Values Study for the years 2000 and 2010 (EVS). The dependent variables are the gender gaps, measured in percentages, as the amount of time devoted by women over the time devoted by men

*** Significant at the 99%; ** significant at the 95%; * significant at the 90%

(17.5%), followed by Italy (16.7%). Paid work gaps in Belgium, France, Spain, Germany, Luxembourg, and Serbia are between 14 and 16%, while gaps in Greece and Poland are estimated between 12.5 and 13.5%. In all these countries, the gap between women and men is more than 1 h per day.

At the other end of the spectrum, we find Estonia, Norway, Hungary, Romania, the UK, and Finland, showing the smallest differences in hours worked for pay, by gender, in the 2010s. The gender gap in paid work in all these countries is less than one hour per day, ranging from 51 min in Finland, to 27 min in Estonia. The gender gap in paid work in

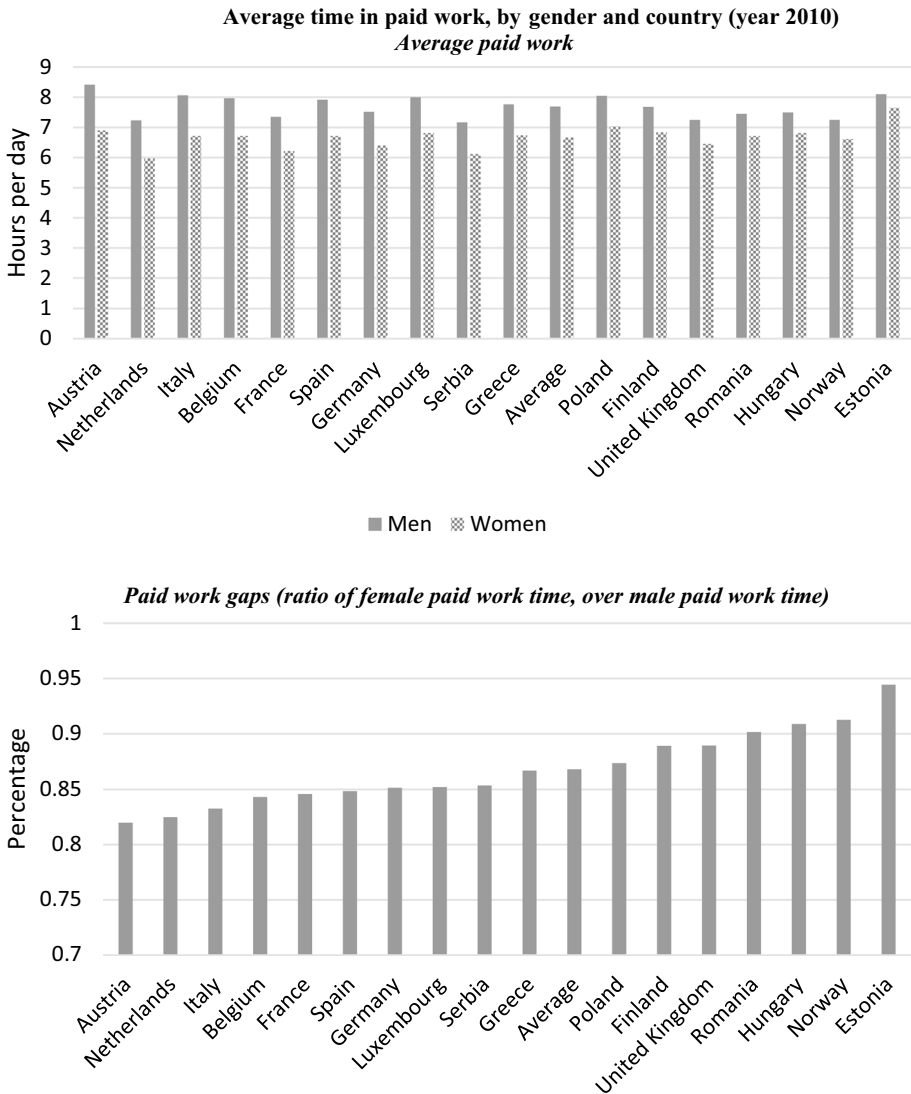


Fig. 1 Average time in paid work, by gender and country (year 2010). *Note* The Sample (Eurostat TUS) has been restricted to countries with available data for the year 2010 and includes the population of all ages. Paid work times are restricted to individuals who report positive paid work time

Finland and the UK is about 11%, as women work about 89% of the time spent working by men. These figures decrease to about 9% in Romania, Hungary, and Norway, where women work between 90 and 95% of the time spent working by men. The smallest gender paid work gap is estimated in Estonia, where women spend about 5.6% less time working than do men. These average differences in paid work are measured in hours per day, and when we translate such differences to the corresponding weekly gender gaps (i.e., multiplying by five) one may think that these differences are significant. Even in the case of the most

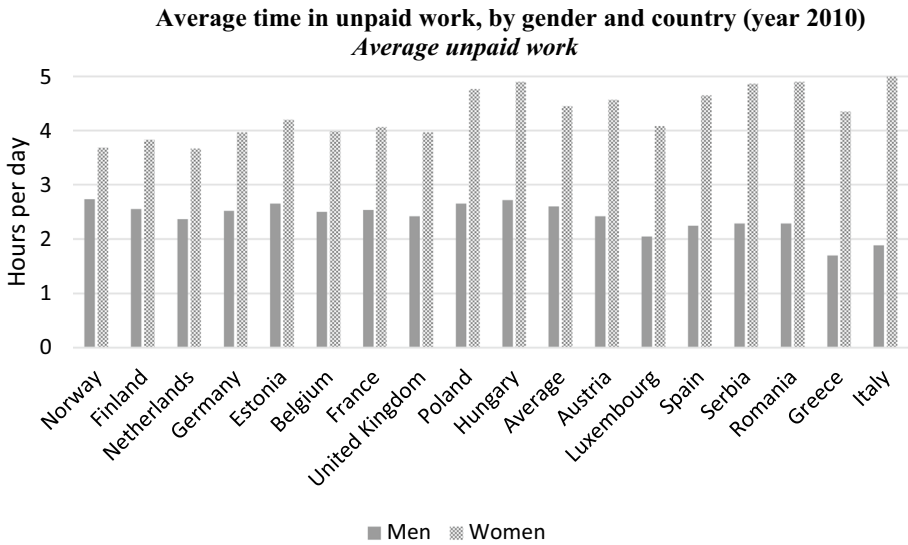
egalitarian country in terms of paid work gaps, Estonia, a difference of about thirty minutes per day translates into a difference of 2.5 h per week.

These gender differences exclude the unemployed (who report zero hours of paid work). Participation in employment tends to be, on average, much greater for men than for women (see, for instance, OECD, 2018, Employment rate indicator, OECD online statistics). To partially account for gender differences in the extensive margin, that is to say, in the labour force participation rate between women and men, we show participation rates by country in Table 1. For all the countries in the sample, female participation rates are well below those of males, with the largest differences found in Italy (20.7% points), Poland (17.6% points) and Serbia (16.1% points), while the smallest differences in participation rates are estimated in Belgium, Finland, and Estonia (the only countries with a gender difference in participation rates of less than 10% points). This preliminary evidence shows that, in the 2010s, women's labour supply is still well below that of men in all European countries.

Since the HETUS survey includes countries from across Europe, it is hard to imagine any of the countries that did not participate in the survey are faring any better, in terms of gender equality in paid work. Women still tend to work, on average, less than men—labour participation rates are lower for women than for men in all EU countries—and there are normally more women than men working part-time. However, these differences in paid work hours by gender do not necessarily reflect individual preferences, as women are over-represented among the long-term unemployed and involuntary part-time workers (OECD, 2018, Unemployment rate/Part-time indicators, OECD online statistics). Furthermore, average hours of work of Europeans, according to HETUS data, are somewhat larger than those based on Labor Force Surveys, as the Time Use diaries enable us to measure actual time spent working on a given day, rather than contractual hours of work. In particular, as is standard, our definition of paid work includes main and secondary jobs, as well as socializing and breaks while at work (Aguilar et al., 2013; Hamermesh & Stancanelli, 2015).

Figure 2 illustrates the average hours of unpaid work by Europeans in the 2010s. The picture is in stark contrast with that of paid work by gender. The main providers of unpaid work are women, in all European countries. On average, European women spend about 4.5 h per day on unpaid work activities, against 2.5 h for European men. The country in which women spend the most time doing unpaid work is Italy, where women spend more than 5 h per day. Italy is followed by Romania, Hungary, and Serbia. In these countries, women perform about 4.9 h of unpaid work on an average day in the 2010s. By any measure, this is a lot of time devoted to unpaid work. However, it is also true that spending between 4 and 5 h per day in unpaid work is common among women in most European countries (Austria, Estonia, France, Greece, Luxembourg, Poland, and Spain) The countries in which women do less than 4 h per day in unpaid work are the remainder, with the least observed in Norway and the Netherlands, at 3.7 h per day. All in all, women devote a significant part of their days to unpaid work, all across Europe.

In contrast, the average time spent by men in unpaid work, in the analyzed countries, is about 2.6 h per day, an average raw gap of 1.9 h, indicating that women do unpaid work almost twice the time spent by men. The population who contribute the least to unpaid work in European countries, performing less than two hours per day of household tasks, is men in Greece (1.7 h) and Italy (1.9 h), followed closely by men from Luxembourg (2.0 h). At the other end of the spectrum are Norwegian men, who do, on average, 2.7 h per day of unpaid work, which puts them easily at the top of the unpaid work rankings in Europe. Men from Hungary are in the second position, followed by Poles, Estonians, Finns, French,



Unpaid work gaps (ratio of female unpaid work time, over male unpaid work time)

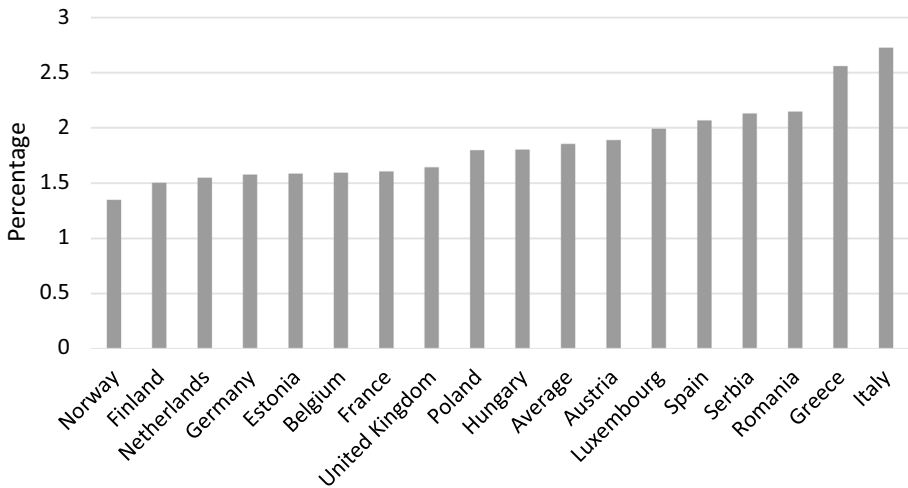


Fig. 2 Average time in unpaid work, by gender and country (year 2010). *Note* The Sample (Eurostat TUS) has been restricted to countries with available data for the year 2010 and includes the population of all ages. Unpaid work is measured in hours per day

Germans, and Belgians, who all do more than 2.5 h of unpaid work per day, on average. Men in the rest of the countries devote between 2 and 2.5 h per day to unpaid work.

In sum, the overall picture is that the bulk of unpaid work is still performed by women. The gender difference in unpaid work is larger than the gender difference in labour market work, reflected in the allocation of leisure time by gender (Fig. 6 in “Appendix 2”), indicating that men spend slightly more time on leisure than do women. This contrasts with the

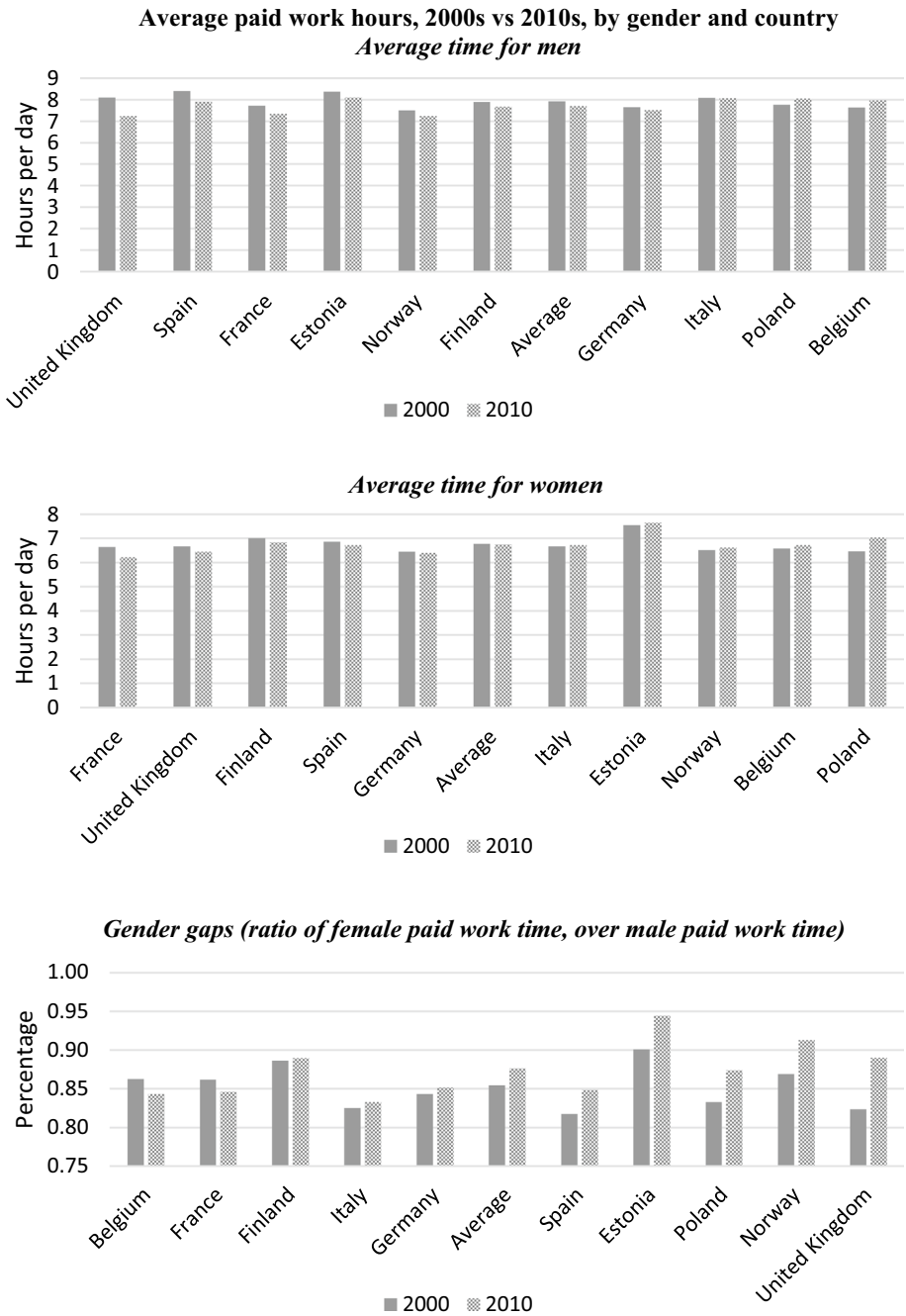


Fig. 3 Average paid work hours, 2000s vs 2010s, by gender and country. *Note* The Sample (Eurostat TUS) has been restricted to countries with available data for the years 2000 and 2010 and includes the population of all ages. Paid work times are restricted to individuals who report positive paid work time

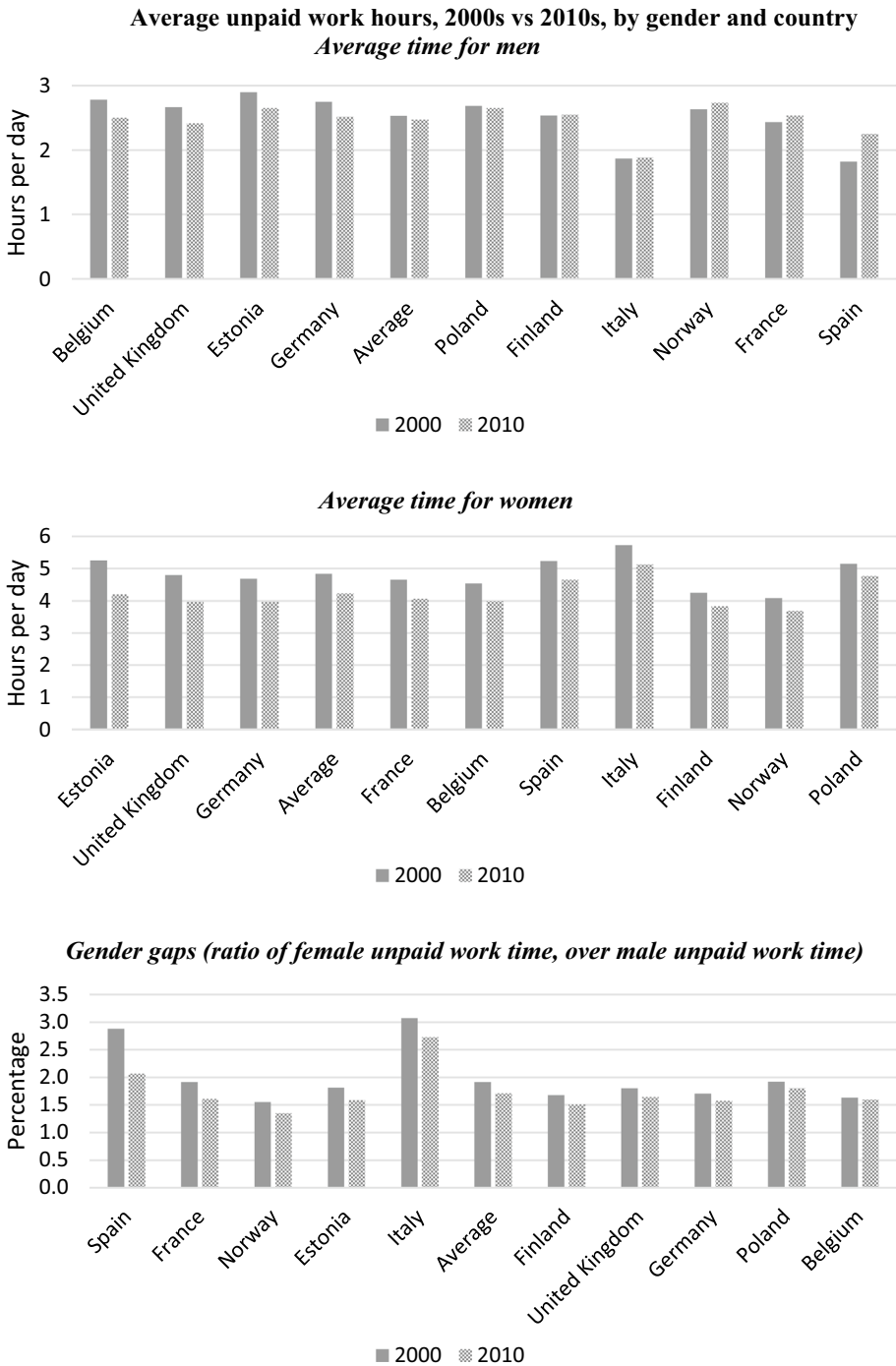


Fig. 4 Average unpaid work hours, 2000s vs 2010s, by gender and country. The Sample (Eurostat TUS) has been restricted to countries with comparable data for the years 2000 and 2010 and includes the population of all ages

large differences in the time devoted to paid and unpaid work by men and women and, in particular, is the opposite of the significant differences in unpaid work.

4.1 Change Between the 2000s and 2010s

Prior literature has reported gender convergence in both paid and unpaid work in European countries over recent decades (Gauthier et al., 2004; Gimenez-Nadal & Sevilla, 2012). We now assess whether this convergence has continued, by comparing the gender gap in paid and unpaid work in the 2000s and the 2010s. The first HETUS survey was carried out in the 2000s, making possible a comparison of the gender imbalances in the past ten years in Europe. To this end, Figs. 3 and 4 show paid and unpaid work hours by gender, along with the relevant gender gaps (women's hours/men's hours), respectively, for both time periods.

Figure 3 shows that hours worked by men have slightly declined in all of the European countries considered, with the exceptions of Poland and Belgium. The greatest decrease is found in the United Kingdom, with a raw difference of almost 1 h (a decrease of about 10.5% in the time spent in paid work activities), followed by Spain, France, and Estonia, with decreases of about 0.5 h. These slight decreases in paid work times are likely to be driven by the recent economic crisis, which is the largest experienced globally since the Great Recession (International Monetary Fund, 2009). The recent crisis officially began in December 2007 and ended in June 2009 in the United States (National Bureau of Economic Research, 2010), although the American labour market has not yet fully recovered. The recession spread to Europe a little later and coincided, to some extent, with the 2010s HETUS survey. The crisis may have affected the intensive side of worker labour supply. On the other hand, in Belgium and Poland, the hours of paid work per day show small increases of about 4% in the 2010s, compared to the 2000s.

The evolution of paid work hours among women shows mixed results. First, a decline in market hours in the 2010s, relative to the 2000s, is reported in France, the UK, Finland, Spain, and Germany. The largest decrease is in France, where women worked in the 2010s about 6.5% fewer hours than in the 2000s. In the remaining countries, decreases in the 2010s are lower than 5%, relative to the 2000s. Moreover, this decline in hours worked by women appears to be much smaller than that of men, across Europe, with the average difference for women being 0.02 fewer hours of work in the 2010s than in the 2000s. Hours worked per day have increased in the remaining countries, with differences of less than 2% in all cases, with the exception of Poland, where women worked in the 2010s about 8.8% more than in the 2000s (a raw difference of about 0.6 h per day).

All in all, given that hours worked by men have slightly declined in most of the European countries considered, and that the time devoted to paid work by women has increased in many countries, the gender gap in paid work has fallen in the past decade. This is translated to decreases in the relative gender gap shown in Fig. 3, where magnitudes closer to 1 indicate a decrease in the paid work relative gender gap. Specifically, Fig. 2 shows dramatic decreases, such as those found in Estonia, Poland, Norway, and the UK; the exceptions are France and Belgium, where the gaps have slightly increased.

Regarding unpaid work time, Fig. 4 shows the evolution of the time devoted to unpaid work for both men and women. For men, we observe a small decline in unpaid work in certain

European countries (e.g., Belgium, the UK, Estonia, Germany, and Poland) relative to the 2000s. On the other hand, we observe a slight increase in unpaid work in Finland, Italy, Norway, and France, where men spend between 1 and 5% more time on household tasks in comparison to the 2000s. The largest increase in unpaid work time is found for men in Spain, who spend in the 2010s about 23% more time on unpaid work, relative to the average unpaid work time of the 2000s. Since Spain is also among the countries in which paid work hours of men declined the most in the 2010s, the increase in unpaid work could also be due to the recession. Indeed, there is evidence that unpaid work increased in the aftermath of the recent recession in the United States (Aguiar et al., 2013) and this may well have also happened in Europe (Gimenez-Nadal & Molina, 2016).⁸

The unpaid work hours of women have slightly changed across Europe in the past decade, with differences no larger than 0.5 h between the two periods analyzed. Given these changes over the period, the gender gap in unpaid work has substantially fallen in all European countries (Fig. 4 shows the gender gap in unpaid work in the 2010s compared to the 2000s, where magnitudes closer to 1 represent smaller relative gender gaps.). The largest decline in the gender gap in unpaid work is found in Spain, where women did triple the time men spent doing unpaid work in the 2000s, compared to only double that in the 2010s. The trends also show substantive decreases in France, Norway, Estonia, and Italy, with gender gaps decreasing by more than 20 min in these countries. However, it is difficult to conclude that these patterns are only transitory, due to the recession having increased the unpaid work hours of men, or they are longer-lasting and reflect changes in men's attitude to household work. Prior research (Gauthier et al., 2004; Gimenez-Nadal and Sevilla, 2012; Fang and MacDaniel, 2016) points to a long-term trend in the gender gap in paid work.

5 Situation by Age

Prior research has shown that individual time allocations vary over the life cycle (Apps & Rees, 2005), as a consequence of employment and retirement patterns, and also family formation. For this reason, we now analyze the gender gap in time allocation for different subgroups of the populations, based on their age. Figure 5 shows the gender difference (females' hours/males' hours) in paid work and unpaid work in the 2010s for the following age groups: 20–24 years, 25–44 years and 45–64 years.⁹ On average, European women aged 20–24 work over 6.7 h per day, while those aged 25–44 work 6.8 h per day, and those aged 45–64 work 6.6 h per day, compared to about 7.5 h for young men, over 7.9 h for prime-age men, and 7.7 h for older men.

The difference in hours worked for pay, by gender, is smaller for younger generations of Europeans, aged 20–25 years, than for older generations, aged 25–44 and 45–64. This reflects convergence in patterns of paid work, by gender, of younger generations, but also the fact that hours worked by men and women in Europe are very similar before family-formation and the arrival of children, but differ thereafter, a fact that is well-documented

⁸ Households tend to increase unpaid work relative to expenditure outside the home; for example, replacing restaurant meals with home meals, or shopping longer to save money (Aguiar and Hurst, 2005). There is also a secular trend in reduced investment in home production, due to technological progress, which could explain the slight drop in unpaid work in most countries (Cavalcanti and Tavares, 2008; Greenwood et al., 2005).

⁹ The analysis is restricted to the 2010's. See Table 5 in "Appendix 1" for full details of the figures corresponding to each country, gender, and age group. The analogous figure for leisure time is shown in Fig. 6 in "Appendix 2".

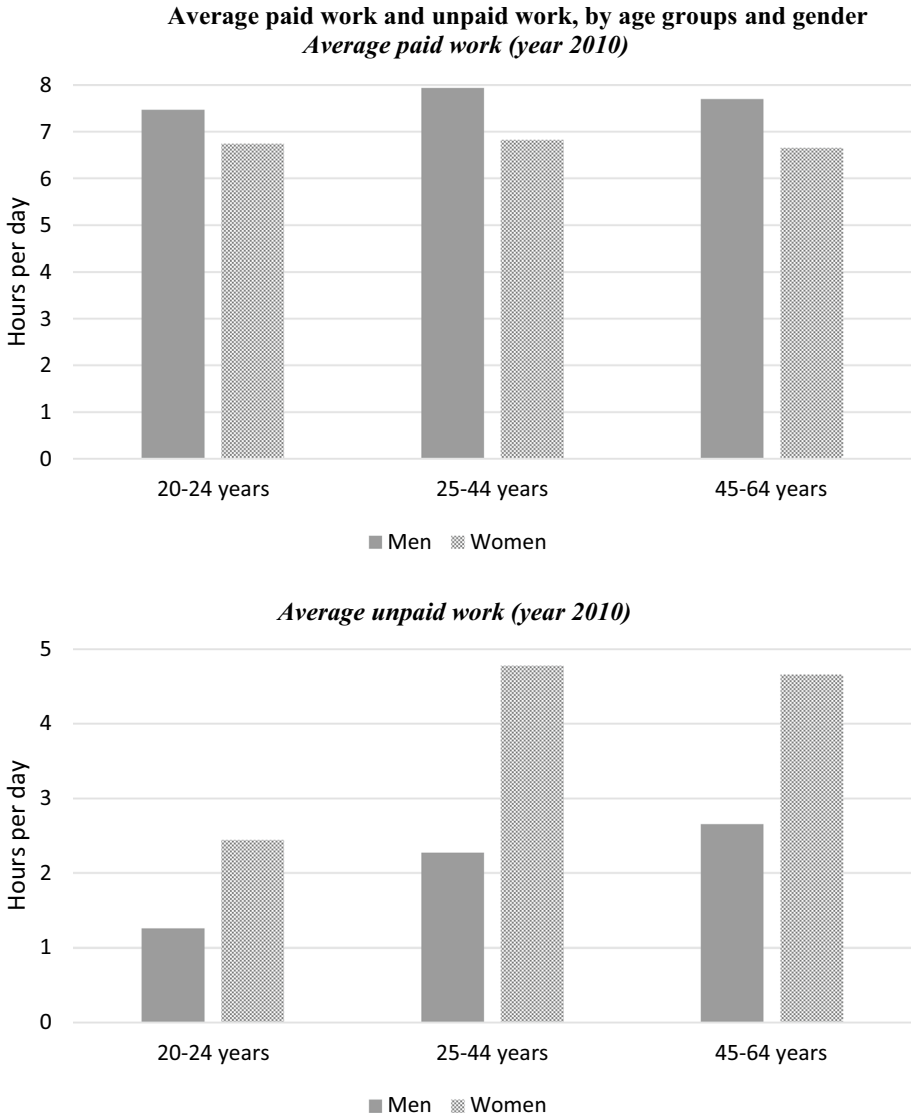


Fig. 5 Average paid work and unpaid work, by age groups and gender. *Note* The Sample (Eurostat TUS) has been restricted to countries with available data for the year 2010 and includes the population of all ages. Paid work times are restricted to individuals who report positive paid work time. Paid work and unpaid work are measured in hours per day

in the literature (Gimenez-Nadal & Sevilla, 2012; Sayer, 2005, 2007; Sevilla et al., 2010; Sevilla Sanz, 2010).

In line with this notion, the increase in average hours worked by prime-age men (aged 25–44) relative to younger men (aged 20–24) is larger than the increase in hours worked by prime-age women relative to younger women. Moreover, the decline in hours worked by older men (aged 45–64) relative to prime-age men is slightly larger, in absolute values,

than the decline in hours worked by older women relative to prime-age women. This likely reflects the fact that older women tend to have accumulated lower social security contributions and lesser entitlements to pension benefits (Bettio & Verashchagina, 2009; Bettio et al., 2013) than have older men, and thus the implicit costs of reduced working hours when older are greater for women than for men, conditional on being employed. There is limited evidence that older women retire later than older men, conditional on older women being employed. For example, Stancanelli (2017) finds that older French women are more likely to retire at age 65 than do older French men, who usually retire at age 60.

Thus, it is notable that the smaller gender differences in paid work are found among younger generations, and even in Greece, women work longer hours than men aged 20–24 years. Hours worked by young women are also quite close to those worked by men in Estonia, Finland, Germany, Hungary, Luxembourg, the Netherlands, Norway, Poland, Romania, Spain, and the UK, where the gender difference in paid work is less than 1 h per day. The largest paid work gap among young adults is found in Belgium, where males spend about 1.6 more hours working than do female workers. For the prime-age group, the average difference in hours worked for pay, by gender, is substantial in most European countries, and especially in Austria (about 2 h), followed by Belgium, France, Germany, Greece, Italy, the Netherlands, Poland, Serbia, Spain, and the United Kingdom (between 1 and 2 h). For the oldest age-group, the largest difference in hours worked by gender occurs in Austria, the Netherlands, and Luxembourg (more than 1.5 h).

Regarding unpaid work, a contrasting picture holds, with the difference in unpaid work hours by gender being the largest for prime-age cohorts, and the smallest, in absolute value, for younger cohorts of Europeans. The average difference remains, however, significant at all ages, with young men spending, on average, half the time on unpaid work that young women do. For all age groups, the differences in unpaid work hours by gender are much greater than the differences in paid work hours by gender, suggesting that, at all ages, women have a heavier “total” workload (the sum of paid and unpaid work hours) than do men in Europe.

Cross-country differences in hours of unpaid work by gender are all negative, as women do more unpaid household work in all European countries, at all ages. The differences are the smallest for the younger age group, equal to less than an hour per day, in Finland, Germany, Greece, Luxembourg, the Netherlands, and Norway, while the differences are largest in Poland and Romania, where young women perform about 2 more hours per day than men on unpaid work tasks. Overall, household work appears still to be a predominantly female activity among younger cohorts of Europeans in the 2010s.

This suggests that traditional social norms applying to unpaid work are likely slower to change than those for paid work. At home, where market profit is less at stake, traditional gender norms appear to prevail across Europe. Some studies have suggested that women, and especially those with a higher level of education, may “compensate” for their active participation in the labour market by increasing the hours of household work at home, to “affirm” their “femininity”, in line with gender-stereotyped roles (Bianchi et al., 2000), which are threatened by their labour market performance. Such a phenomenon has been labelled ‘doing gender’ in the literature and helps explain the puzzling picture of increased hours of both paid and unpaid work by certain groups of women (Sevilla et al., 2010). However, many parallel and alternative explanations are possible here, and we explore this channel in the next Section.

Overall, the picture is one of significant differences in the hours of unpaid work by gender all over Europe, and for all age groups, with such differences being the largest in absolute value for prime-age groups, where it varies from a low of 1 h per day in Norway, to a high of almost 4 h in Italy and Serbia. These large differences in unpaid work time may reflect the fact that many women in these countries do not participate in the labour market

but are full-time housewives. However, when women contribute to both paid and unpaid work, a persistent double-burden at work and at home (Giménez-Nadal & Sevilla, 2011) is a serious handicap to equality of opportunity by gender in the labour market.

There is evidence that more investment in unpaid work also leaks into the labour market, with more unpaid work being associated with lower wages for partnered women (Hersh & Stratton, 1994). Couple-formation and the birth of children certainly contribute to explain the large gender imbalance of household work among prime-age Europeans, as the difference is smaller, not only for younger cohorts but also for the older cohort, aged 45–64. In the oldest age-group, the difference in hours of unpaid work by gender is the lowest, equal to about one hour or less per day in Norway, followed by Estonia, Finland, and the Netherlands. The difference is closer to two hours in Belgium, France, Hungary, Poland, and Luxembourg, while it is equal to about three hours in Romania, Serbia, Greece, and Spain, and well above three hours in Italy.

6 Possible Determinants of Gender Gaps in Paid and Unpaid Work

The evidence in Sects. 4 and 5 indicates clear differences between men and women in the time devoted to paid work and unpaid work for our analyzed countries, with (working) men devoting more time to paid work than (working) women, and women devoting more time to unpaid work than men. However, it is important to note that some countries present a more egalitarian behavior regarding gender differences in paid and unpaid work. For example, in Norway and Finland, women spend on average 0.7 fewer hours per day on paid work and 1.15 more hours per day on unpaid work in comparison to men, with the gender gaps in these two countries being lower than the average (− 1.02 and 1.94 for paid and unpaid work, respectively), which makes these two countries comparatively egalitarian in terms of the gender gap in time allocation. On the contrary, in Italy and Greece, the gender gaps in paid and unpaid work are higher than the average, indicating that these countries may be less egalitarian in the gender distribution of paid and unpaid work.

We link cross-country differences in these gender gaps to differences in country-level factors, mainly social norms and institutional factors. First, we use data from the 1999 and 2008 EVS to analyze the role that social norms play in shaping cross-country differences in gender gaps. This data contains information on attitudes of the population, which can be used to link social norms with gender gaps. We construct a neutral index to measure the degree of equality in each country, using data from the EVS.¹⁰

The relationship between gender gaps and social norms is studied using multi-level mixed-effect regressions at the country level, considering the average standardized values of the social norms indicators and the neutral index at the country level (i.e., explanatory variables), and the gender gaps, measured as the amount of time devoted by women, over the time devoted by men (i.e., dependent variables). Multilevel models, or linear mixed-effects models, are econometric and parametric models (i.e., generalizations of linear regressions in this particular case), in which the parameters may vary across more than one level, although in this case they vary on a single level, which is the country. Multilevel models are particularly appropriate for analyses where data units are organized on more than one level, such as aggregate units, or time and space (see Goldstein, 2011). In our case, the equation we estimate is as follows:

$$Gap_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it},$$

¹⁰ See Sect. 3 and Table 7 of “Appendix 3” for a detailed description of the variables measuring social norms, and the neutral index.

where Gap_{it} is the dependent variable, which varies by country and potentially by year, and X_{it} represents each of the (standardized) social norms or institutional indices considered, with “ i ” representing each country in the sample, and “ t ” the time index. The gender gap ($\frac{T_w}{T_m}$) is measured as the ratio of the hours per day devoted by women (T_w) over the hours devoted by men (T_m) to the reference activity. Parameter β_0 represents a common intercept, β_1 represents the slope that drives the relationship between the dependent variable and the regressor, and ε_{it} is the error term. We consider that β_1 is a common factor for all the countries; given that there is not a longitudinal variation for every country in the sample, the data does not allow for a more sophisticated multilevel specification, where coefficients may be country-specific. Here, the estimated coefficients are equivalent to standard OLS estimates of linear regressions, and to multivariate regressions.¹¹ However, the estimated standard errors may diverge, given that in multilevel equations the coefficients are estimated by a level 2 equation: $\beta_1 = \gamma + u_i$. Multilevel equations are estimated by maximum likelihood, for the gaps in paid work and unpaid work separately. (Variances of the random effects parameter residuals are available upon request.)

In the analysis of the gender gap in paid and unpaid work, we consider the sample of workers (paid work), on the one hand, and the entire population, on the other (unpaid work). Table 2 shows the coefficients of interest of the multi-level regressions of gender gaps in paid work for workers (Column (1)), and in unpaid work for the entire population (Column (2)). Results in Table 2 ((Column (1)) show that Indicators 1, 2, and 4 are positively related to the gender gap in paid work in the case of workers. In the case of paid work, a positive association of any of these indicators with paid work indicates that the gender gap in paid work decreases, which may be interpreted as that, in countries with less traditional social norms (more egalitarian regarding the roles of men and women in the country), the gender gap in paid work decreases.

Regarding unpaid work, Indicators 1–7 and the Neutral index are negatively related to the gender gap in unpaid work (Column 2, entire population). Given that a negative association with unpaid work indicates that the gender gap in unpaid work decreases, and that higher values of the indicators and the Neutral index are related to the countries being less “traditional”, these results indicate that, in countries with less traditional social norms, the gender gap in unpaid work is smaller than in countries with social norms that are more traditional.

All in all, these results suggest the importance of social norms in explaining imbalances in paid and unpaid work and can be interpreted as follows: in countries—or groups of individuals—with less “traditional” attitudes toward the role of women in society, the gender gaps in both paid and unpaid work are smaller. Furthermore, these attitudes are closely related to the role of women as carers, given that Attitudes 2, 3, and 7 address the responsibility for child care. The findings here are consistent with prior literature highlighting the importance of social norms in shaping individual time allocation decisions (Campaña et al., 2018; Gimenez-Nadal et al., 2012; Sevilla-Sanz, 2010).

Following an analogous approach, the relationship between gender gaps in paid and unpaid work, on the one hand, and variables measuring institutional differences across countries, on the other, is analyzed. Specifically, the following variables are considered: public spending on families (cash) as a percentage of GDP; public spending on families (services); public spending on parental leave; maternity leave; paternity leave; and maternity/paternity paid weeks. In addition to these institutional factors, the analysis includes a measure of women’s access to top jobs. A measure of the proportion of women employed

¹¹ OLS estimates, which provide robust conclusions and equivalent point estimates, are available upon request.

Table 3 Multi-level estimates—paid and unpaid work gaps, and institutional factors

	(1)	(2)	(3)
	Paid work gap (workers)	Unpaid work gap (all sample)	N. obs
Public spending on families (cash)	0.013* (0.007)	− 0.216* (0.113)	25
R-squared	0.149	0.232	
Public spending on families (services)	0.009 (0.007)	− 0.206*** (0.069)	25
R-squared	0.077	0.211	
Public spending on parental leave	0.019*** (0.004)	− 0.150** (0.075)	23
R-squared	0.457	0.105	
Maternity leave	0.002 (0.006)	0.098 (0.099)	23
R-squared	0.006	0.045	
Paternity leave	0.018*** (0.004)	− 0.201*** (0.073)	23
R-squared	0.427	0.187	
Maternity paid weeks	0.018*** (0.004)	− 0.167*** (0.058)	23
R-squared	0.422	0.129	
Paternity paid weeks	− 0.002 (0.005)	− 0.148* (0.084)	23
R-squared	0.006	0.102	
HDI	− 0.002 (0.007)	− 0.182*** (0.059)	27
R-squared	0.004	0.174	
GDI	0.023*** (0.004)	− 0.160* (0.082)	27
R-squared	0.479	0.134	
GII	0.010* (0.005)	0.104** (0.051)	27
R-squared	0.087	0.057	
Women in management positions	0.015*** (0.004)	− 0.256*** (0.081)	26
R-squared	0.208	0.330	
Women in national parliaments	− 0.003 (0.006)	− 0.216*** (0.072)	26
R-squared	0.011	0.234	

Robust standard errors in parentheses. The Sample (Eurostat TUS) has been restricted to countries with available data for the years 2000 and 2010. The dependent variables are the gender gaps, measured in percentages, as the amount of time devoted by women over the time devoted by men

*** Significant at the 99%; ** significant at the 95%; * significant at the 90%

in managerial positions in each country considered is used. Gender equality is important in the political arena, where women tend, generally, to be highly under-represented. The representation of women among decision-makers has been shown to impact the budgets devoted to public spending in the area of social expenditure, as well as future gender norms (Bearman et al., 2009). A relatively higher proportion of women sitting in the national parliaments and local governments is associated with lower gender gaps in paid and unpaid work. A measure of gender disparities in life expectancy, education, and income is considered, which is a standard measure of the level of economic development and may capture other sources of gender imbalances stemming from country institutional differences.

Table 3 shows the coefficients of interest of the multi-level regressions of gender gaps in paid work (workers), and unpaid work (entire population), on institutional factors. A positive coefficient between a given measure and paid work gaps indicates that the gender gap in paid work decreases with higher values of that measure, while a positive association with unpaid work indicates that the gender gap in unpaid work increases.

It is found that when public spending on cash family benefits is higher, both gender gaps in paid work, and the gender gap in unpaid work, are smaller, while when public spending on services family benefits is higher, the gap in unpaid work decreases. As to more generous family-friendly policies, in terms of public spending on parental leave, we observe that these are related to greater equality in paid and unpaid work. Similarly, regarding parental leave policies, “better” parental leave policies, measured in terms of spending as a percentage of GDP, are related to more equality in paid and unpaid work. Focusing on the public spending on paternity leave, although the duration of paternity leave varies substantially across countries, there is evidence that the take-up of paternity leave is low (Karu & Tremblay, 2018), suggesting that few fathers take the paternity leave they are entitled to (Van Belle, 2013).

The relationship between maternity leave and gender gaps in paid and unpaid work is not statistically significant at standard levels, while the duration of paternity leave is significantly correlated with decreases in all the gender gaps studied. In other words, estimates suggest that increases in maternity leave may help to reduce gender gaps in both paid and unpaid work. Furthermore, and regarding parental paid weeks, the duration of maternity paid leave appears to significantly reduce gender gaps. These estimates provide an interesting insight into the impact of parental leave policies on intrahousehold inequality and gender gaps, since maternity paid weeks, but not the duration of maternity leave, seem to affect gender gaps in paid and unpaid work. For paternity leave policies, the results reveal an opposite scenario, where the duration of paternity leave reduces gender gaps, while paternity paid weeks are only statistically significant at standard levels in the unpaid work gap.

Regarding the three indices aimed at capturing gender equity (Human Development Index, Gender Development Index, and Gender Inequality Index), gender gaps in unpaid work decrease in countries that are more egalitarian in terms of gender development. Gender gaps in paid work decrease in the case of the Gender Development Index and the Gender Inequality Index.¹² Finally, the positions of women in firms is correlated with decreases in gender gaps in both paid and unpaid work hours, and the position of women in institutions is correlated with decreases in gender gaps in unpaid work, with the number of women in management positions being more important than the number of women in national parliaments, both qualitatively and quantitatively.

Thus, focusing on public budgets may provide a more comprehensive picture, which also accounts implicitly for the duration (as expenditure increases with the duration) and

¹² The Gender Inequality Index (GII) measures gender imbalances, and thus its sign should be interpreted as opposite to the remaining indices.

also for the take-up rates (as expenditure is null for non-takers). More generous paternity/parental leave policies imply that men may be more involved in care responsibilities, which may reduce the gender gap in unpaid work, and may also reduce it in paid work, since women would be able to devote more time to the labour market. In particular, in countries where the number of employment-protected parental leave weeks is larger, the gender gap in paid and unpaid work is smaller. These results corroborate and reinforce the argument that “gender equality and work-life balance should be supported through a revised and coherent legislative framework covering maternity leave, paternity leave, parental leave, and carer’s leave, encouraging equal take-up of leave arrangements by men and women in order to improve women’s access to and position in the labour market” (European Commission Proposal 2015/0085).

The findings reported in this section also highlight that, generally, European men are still much less involved than are women in care responsibilities, and this is likely to be closely related to the social norms examined earlier. Results summarized here are consistent with the findings reported in Fernandez-Crehuet et al. (2016), who develop a composite indicator to build a new ranking of Work-Life Balance in European countries. These authors find that countries with more generous leave policies are also those that attain a better work-life balance. Furthermore, they show that the number of children under age 3 enrolled in formal education is an important component of the work-life balance of individuals, since in countries with a higher percentage of children under 3 in formal education, residents report a better work-life balance.

7 Conclusion

This paper explores the gender gap in time allocation in European countries, offering a comparison of the case in the 2000s and in the 2010s. It also offers an explanation of the documented gender gaps based on social norms and institutional factors. The evidence corroborates the findings of earlier studies and establishes that the shares of paid and unpaid work of European men and women remain unequal in the 2010s. Furthermore, the results show that the gender gap in both paid and unpaid work has decreased in most countries, leading to a more egalitarian gender distribution of leisure time. However, these gender gaps are still significant in certain countries, and cross-country heterogeneity exists regarding the magnitude of these gender gaps.

Social norms are related to gender inequalities in paid and unpaid work time, since in countries with less traditional social norms regarding the role of women, the gender gaps are smaller. Institutional factors are also related to the gender gaps in paid and unpaid work, since in countries with family policies that promote greater participation of men in family life, the gender gaps in paid and unpaid work are relatively small. In countries where the participation of women in the labour market is boosted through their participation in managerial positions and in national parliaments, the gender gaps in both paid and unpaid work are also relatively small.

Differences in the paid and unpaid workload of European men and women are still sizable in the 2010s, and the consequences can be significant, not only for equality of opportunity by gender, but also in terms of foregone economic productivity and growth. For example, Hsie et al., (2013) estimate that the increased entry of women (and blacks) in highly-skilled occupations, such as medicine and law, in the past fifty years in the US, accounts for about one quarter of the growth in aggregate output per capita over this period. Cavalcanti and Tavares (2016) measure the American gender

wage gap against that of several other countries, finding that a 50% increase in the gender wage gap would lead to a 35% decrease in income per capita. This implies that the under-representation of European women in the labour market may undermine Europe's economic growth. Moreover, there is evidence that the unequal share of market and unpaid work by gender is a source of marital conflict (Bargain et al., 2012).

This paper reinforces the conclusion that more generous leave policies, together with more and better childcare facilities (availability of affordable and high quality childcare centres, and out-of-school-hours care) would lead to a better work-life balance and help reduce the gender gaps in paid and unpaid work. Gender-based taxation schemes, with higher marginal tax rates for men, may also constitute a good point for successfully shifting the household division of labour in a more egalitarian direction. Policies aimed at impacting social norms regarding the care of other adults, which usually occurs at the end of the working life, may also help to reduce the gender gaps in paid and unpaid work. However, inequalities caused by gender norms are deeply rooted in individual and social consciousness and are resistant to change, which may make the redistribution of paid and unpaid work very difficult (Seguino, 2007).

Appendix 1

See Tables 4, 5.

Table 4 Participating countries and waves of HETUS surveys

	Wave 2000	Wave 2010
Belgium	2005	2013
Bulgaria	2002	–
Germany	2001	2012
Hungary	–	2009
Estonia	1999	2009
Spain	2002	2008
France	1998	2009
Italy	2002	2008
Latvia	2003	–
Lithuania	2003	–
Poland	2003	2013
Slovenia	2000	–
Finland	1999	2009
Luxembourg	–	2014
United Kingdom	2000	2014
Norway	2000	2010
Serbia	–	2010
Romania	–	2010
Greece	–	2011
Netherlands	–	2010
Austria	–	2009
Turkey	–	2010

Source: Authors' calculation

Table 5 Average hours per day of paid work and unpaid work, by age group and gender (year 2010)

	20–24 years			25–44 years			45–64 years		
	Men	Women	Diff.	Men	Women	Diff.	Men	Women	Diff.
<i>Panel A: paid work hours</i>									
Austria	8.550	7.333	1.217	8.733	6.900	1.833	8.283	6.717	1.567
Belgium	8.167	6.550	1.617	8.183	6.833	1.350	8.017	6.633	1.383
Estonia	8.183	7.850	0.333	8.100	7.583	0.517	8.267	7.750	0.517
Finland	7.250	6.400	0.850	7.950	6.983	0.967	7.800	6.967	0.833
France	6.667	5.550	1.117	7.583	6.433	1.150	7.500	6.417	1.083
Germany	7.650	7.067	0.583	7.817	6.533	1.283	7.483	6.333	1.150
Greece	5.983	6.517	-0.533	8.000	6.567	1.433	7.700	7.033	0.667
Hungary	7.500	6.667	0.833	7.950	7.000	0.950	7.200	6.800	0.400
Italy	7.767	6.483	1.283	8.217	6.800	1.417	7.983	6.667	1.317
Luxembourg	8.333	7.733	0.600	8.033	7.117	0.917	8.050	6.400	1.650
Netherlands	6.867	6.483	0.383	7.483	6.233	1.250	7.367	5.583	1.783
Norway	7.183	6.617	0.567	7.350	6.650	0.700	7.417	6.700	0.717
Poland	7.900	7.267	0.633	8.267	7.133	1.133	7.950	6.967	0.983
Romania	7.267	6.883	0.383	7.783	7.283	0.500	7.483	6.550	0.933
Serbia	6.950	5.667	1.283	7.817	6.683	1.133	7.317	6.200	1.117
Spain	7.317	6.750	0.567	7.950	6.633	1.317	8.033	6.883	1.150
UK	7.417	6.850	0.567	7.717	6.617	1.100	7.050	6.533	0.517
<i>Panel B: unpaid work hours</i>									
Austria	1.317	2.517	-1.200	2.250	5.167	-2.917	2.633	4.700	-2.067
Belgium	1.167	2.167	-1.000	2.467	4.183	-1.717	2.800	4.600	-1.800
Estonia	1.467	2.933	-1.467	2.467	4.683	-2.217	3.067	4.150	-1.083
Finland	1.667	2.150	-0.483	2.583	4.667	-2.083	2.733	3.783	-1.050
France	1.133	2.350	-1.217	2.433	4.500	-2.067	2.717	4.400	-1.683
Germany	1.167	1.883	-0.717	2.350	4.367	-2.017	2.633	4.033	-1.400
Greece	0.983	1.833	-0.850	1.467	4.350	-2.883	1.967	5.167	-3.200
Hungary	1.417	2.800	-1.383	2.583	5.550	-2.967	3.233	5.100	-1.867
Italy	0.600	2.217	-1.617	1.483	5.350	-3.867	2.217	5.950	-3.733
Luxembourg	1.150	1.883	-0.733	1.900	4.283	-2.383	2.467	4.600	-2.133
Netherlands	1.517	1.867	-0.350	2.183	4.133	-1.950	2.650	4.033	-1.383
Norway	1.517	2.333	-0.817	3.183	4.367	-1.183	2.750	3.617	-0.867
Poland	1.550	3.583	-2.033	2.633	5.583	-2.950	2.983	4.783	-1.800
Romania	1.417	3.633	-2.217	1.983	5.083	-3.100	2.733	5.533	-2.800
Serbia	1.067	2.333	-1.267	1.817	5.417	-3.600	2.600	5.400	-2.800
Spain	1.083	2.467	-1.383	2.567	5.033	-2.467	2.283	5.183	-2.900
UK	1.183	2.550	-1.367	2.267	4.483	-2.217	2.667	4.133	-1.467

The Sample (Eurostat TUS) has been restricted to countries with available data for the year 2010 and includes the population of all ages. Paid work times are restricted to individuals who report positive paid work time. Paid work and unpaid work are measured in hours per day. Differences between males and females are computed as the average time spent by males, minus the average time spent by females, and measured in hours per day

Appendix 2

See Fig. 6.

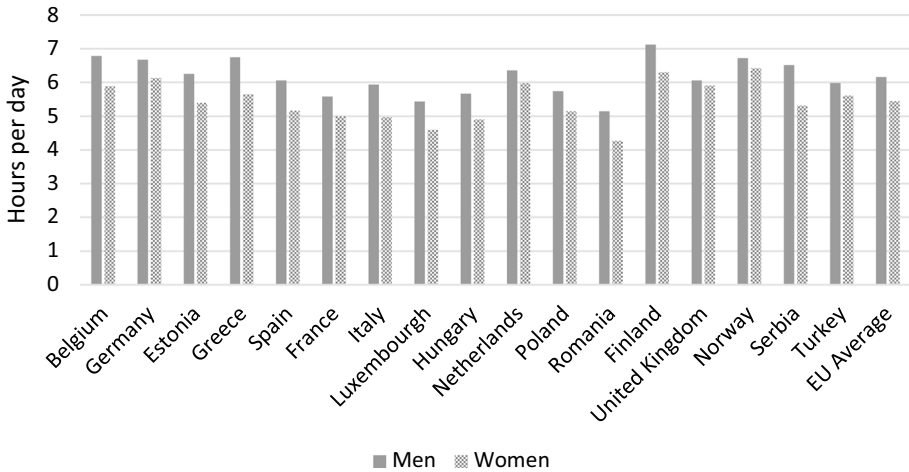


Fig. 6 Average time in leisure, by gender and country (year 2010). *Note* The Sample (Eurostat TUS) has been restricted to countries with available data for the year 2010, and includes the population of all ages, and individuals out of work. Leisure time is measured in hours per day

Appendix 3

The following countries and years are included in the analysis of social norms: Belgium (2000 and 2010), Germany (2000 and 2010), Estonia (2000 and 2010), Greece (2010), Spain (2000 and 2010), France (2000 and 2010), Italy (2000 and 2010), Luxembourg (2010), Hungary (2010), Austria (2010), The Netherlands (2010), Poland (2000 and 2010), Romania (2010), Finland (2000 and 2010), United Kingdom (2000 and 2010), Norway (2010), and Serbia (2010). For each year and country, we calculate the average value given to each question, where sample weights included in the EVS are used to compute the averages (see Table 7 for the average values, by country).

Once average values for each question are calculated by gender, we apply the PCA to compute the value of the Neutral index, values that we link to the gender gaps in paid and unpaid work in Sect. 4.

Regarding the analysis of institutional factors, we use the following variables:

- Public spending on families (cash), as a percentage of GDP: obtained from the Organisation for Economic Co-operation and Development (OECD) database, defined as the (% of GDP) child-related cash transfers (cash benefits) to families with children.
- Public spending on families (services): obtained from the OECD database, defined as the public spending on services for families (benefits in kind) with children.
- Public spending on parental leave: obtained from the OECD database, defined as the public expenditure on maternity and parental leaves per child born.
- Maternity leave: obtained from the OECD database, defined as employment-protected leave of absence for employed women around the time of childbirth (or adoption, in some countries).
- Paternity leave: obtained from the OECD database, defined as employment-protected leave of absence for employed fathers at, or in the first few months after, childbirth.

- Maternity/paternity weeks: obtained from the OECD database, defined as the period for which a mother/father can be on parental leave with her/his job protected (including maternity/paternity leave), disregarding payment conditions.
- HDI (Human Development Index): obtained from the Human Development Data, defined as a summary measure of average achievement in key dimensions of human development.
- GDI (Gender Development Index): obtained from the Human Development Data and aimed at measuring gender gaps in human development achievements.
- GII (Gender Inequality Index): obtained from the Human Development Data for the measurement of gender disparity.
- Positions held by women in senior management: obtained from the European Institute for Gender Equality (EIGE), measuring the share of female board members in the largest publicly-listed companies.
- Seats held by women in national parliaments and governments: obtained from EIGE, measuring the proportion of women in national parliaments and national governments.

See Tables 6, 7, 8.

Table 6 Correlation matrix—social norms (wages 1999 and 2008)

	Attitude 1	Attitude 2	Attitude 3	Attitude 4	Attitude 5	Attitude 6	Attitude 7	Neutral index
Indicator 1	1.000							
Indicator 2	0.800	1.000						
Indicator 3	0.403	0.686	1.000					
Indicator 4	0.365	0.283	-0.017	1.000				
Indicator 5	0.199	0.369	0.337	0.680	1.000			
Indicator 6	0.089	0.209	0.477	0.285	0.608	1.000		
Indicator 7	0.379	0.554	0.506	0.398	0.239	0.142	1.000	
Neutral index	0.727	0.895	0.779	0.504	0.627	0.520	0.661	1.000

Egalitarian Attitude data comes from the EVS (European Values Study) wages 1999 and 2008. We use 7 questions from the EVS that can be used to measure gender attitudes. These questions are as follows: A working mother can establish just as warm and secure a relationship with her children as a mother who does not work (Attitude 1). A pre-school child is likely to suffer if his or her mother works (Attitude 2). A job is alright but what most women really want is a home and children (Attitude 3). Being a housewife is just as fulfilling as working for pay (Attitude 4). Having a job is the best way for a woman to be independent (Attitude 5). Both the husband and wife should contribute to the household income (Attitude 6). In general, fathers are as well suited to look after their children as mothers (Attitude 7). There are four possible answers for each question (1 = strongly agree, 2 = agree, 3 = disagree, 4 = disagree strongly). In order to interpret the attitudinal questions, higher values of the questions are related to less "traditional" social norms. For questions 1, 5, 6, and 7 the value "0" represents the options "disagree" and "strongly disagree" and value "1" represents the options "strongly agree" and "agree", while for questions 2, 3, and 4 the value "0" represents the options "agree" and "strongly agree" and value "1" represents the options "strongly disagree" and "disagree". These variables are standardized, so that higher values of all the items represent more egalitarian social norms, and lower values represent less egalitarian social norms. The Neutral index combines the seven attitudes into one index

Table 7 Social norms, overview

Country	Year	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6	Indicator 7	Neutral Index
Belgium	2000	0.80	0.49	0.46	0.64	0.24	0.30	0.77	0.53
	2010	0.85	0.62	0.46	0.65	0.19	0.18	0.82	0.55
Germany	2000	0.68	0.35	0.56	0.43	0.20	0.27	0.74	0.47
	2010	0.72	0.43	0.58	0.47	0.17	0.18	0.74	0.48
Estonia	2000	0.72	0.36	0.32	0.58	0.22	0.19	0.68	0.44
	2010	0.80	0.42	0.31	0.62	0.20	0.13	0.76	0.47
Greece	2010	0.76	0.28	0.25	0.56	0.14	0.08	0.65	0.39
	2000	0.78	0.55	0.52	0.54	0.20	0.17	0.73	0.51
Spain	2010	0.77	0.53	0.52	0.46	0.14	0.13	0.81	0.49
	2000	0.77	0.43	0.34	0.63	0.16	0.19	0.80	0.48
France	2010	0.87	0.61	0.46	0.52	0.13	0.10	0.89	0.53
	2000	0.64	0.19	0.32	0.55	0.24	0.20	0.68	0.40
Italy	2010	0.70	0.25	0.34	0.50	0.18	0.12	0.73	0.40
	2000	0.85	0.42	0.52	0.59	0.13	0.27	0.88	0.52
Luxembourg	2010	0.79	0.45	0.34	0.56	0.19	0.06	0.73	0.46
Hungary	2010	0.83	0.62	0.62	0.57	0.33	0.53	0.80	0.62
	2000	0.74	0.38	0.52	0.57	0.15	0.18	0.79	0.48
Netherlands	2010	0.74	0.38	0.52	0.57	0.15	0.18	0.79	0.48
	2000	0.55	0.24	0.25	0.61	0.24	0.13	0.87	0.41
Austria	2010	0.66	0.40	0.33	0.63	0.22	0.15	0.82	0.46
	2000	0.88	0.45	0.16	0.55	0.17	0.13	0.65	0.43
Romania	2000	0.95	0.60	0.51	0.79	0.38	0.28	0.87	0.63
Finland	2010	0.97	0.78	0.63	0.75	0.39	0.22	0.93	0.68
	2000	0.71	0.53	0.54	0.60	0.35	0.32	0.72	0.54
United Kingdom	2010	0.82	0.63	0.55	0.67	0.36	0.25	0.81	0.59
	2000	0.91	0.81	0.65	0.48	0.16	0.09	0.88	0.59
Norway	2010	0.91	0.81	0.65	0.48	0.16	0.09	0.88	0.59

Table 7 (continued)

Country	Year	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6	Indicator 7	Neutral Index
Serbia	2010	0.81	0.51	0.42	0.53	0.18	0.05	0.71	0.47

Egalitarian Attitude data comes from the EVS (European Values Study) waves 1999 and 2008. We use 7 questions from the EVS that can be used to measure gender attitudes. These questions are as follows: A working mother can establish just as warm and secure a relationship with her children as a mother who does not work (Attitude 1). A preschool child is likely to suffer if his or her mother works (Attitude 2). A job is alright but what most women really want is a home and children (Attitude 3). Being a housewife is just as fulfilling as working for pay (Attitude 4). Having a job is the best way for a woman to be independent (Attitude 5). Both the husband and wife should contribute to the household income (Attitude 6). In general, fathers are as well suited to look after their children as mothers (Attitude 7). There are four possible answers for each question (1 = strongly agree, 2 = agree, 3 = disagree, 4 = disagree strongly). In order to interpret the attitudinal questions, higher values of the questions are related to less "traditional" social norms. For questions 1, 5, 6, and 7 the value "0" represents the options "disagree" and "strongly disagree" and value "1" represents the options "strongly agree" and "disagree", while for questions 2, 3, and 4 the value "0" represents the options "agree" and "strongly agree" and value "1" represents the options "strongly disagree" and "disagree". These variables are recoded so that higher values on all the items represent more egalitarian social norms, and lower values represent less egalitarian social norms. The Neutral index combines the seven attitudes into one index

Table 8 Institutional factors, overview

Country	Year	Public spending on families (cash)	Public spending on families (services)	Public spending on parental leave	Maternity leave	Paternity leave	Maternity paid weeks	Paternity paid weeks	HDI	GDI	GII	Women management positions	Women national parliaments
Belgium	2000	1.73	0.72	0.15	14.00	0.60	14.00	0.60	0.87	0.97	0.12	6	34.2
	2010	1.77	1.04	0.17	15	0.6	28	13.6	0.88	0.98	0.09	10.5	38.8
Germany	2000	1.34	0.71	0.21	14.00	0.00	109.33	0.00	0.86	0.94	0.13	9.8	30.9
	2010	1.23	0.92	0.23	14	0	58	8.67	0.91	0.96	0.1	12.6	31.5
Estonia	2000	1.52	0.23	-	-	-	-	-	0.78	1.03	0.28	14.7	17
	2010	2.14	0.42	-	-	-	-	-	0.84	1.04	0.17	7	22.8
Greece	2010	0.93	0.43	0.16	43.00	0.40	43.00	0.40	0.86	0.95	0.16	6.2	17
Spain	2000	0.29	0.65	0.12	16.00	0.40	16.00	0.40	0.82	0.97	0.12	3.3	28.6
	2010	0.63	0.83	0.34	16.00	2.10	16.00	2.10	0.87	0.98	0.11	9.5	34.6
France	2000	1.43	1.50	0.00	16.00	0.00	16.00	0.00	0.85	0.98	0.19	5.3	11.6
	2010	1.60	1.26	0.00	16.00	2.00	42.00	2.00	0.88	0.99	0.13	12.3	20.4
Italy	2000	0.60	0.56	0.12	21.67	0.00	47.67	0.00	0.83	0.95	0.18	1.9	10.2
	2010	0.69	0.66	0.19	21.67	0.00	47.67	0.00	0.87	0.97	0.12	4.5	20.2
Luxembourg	2010	3.35	0.66	0.47	16.00	0.40	42.00	26.40	0.89	0.98	0.13	3.5	20
Hungary	2010	2.22	1.19	0.78	24.00	1.00	160.00	1.00	0.82	0.99	0.25	13.6	8.8
	2010	0.69	0.84	0.00	16.00	0.40	42.00	26.40	0.91	0.95	0.05	14.9	38.7
Austria	2010	2.19	0.63	0.30	16.00	0.00	44.00	8.70	0.87	0.98	0.12	8.7	29.4
	2000	0.95	0.23	0.28	20.00	0.00	20.00	0.00	0.78	0.99	0.20	-	-
Poland	2010	0.78	0.55	0.34	22.00	1.00	22.00	1.00	0.83	1.01	0.17	11.6	17.5
	2010	-	-	-	-	-	-	-	0.80	0.99	0.36	21.3	9.8
Finland	2000	1.70	1.23	0.62	17.50	3.00	161.03	3.00	0.86	1.00	0.09	11.7	37.2
	2010	1.58	1.54	0.72	17.50	3.00	159.00	7.00	0.88	1.00	0.08	25.9	39.5
United Kingdom	2000	1.74	0.82	0.07	40.00	0.00	18.00	0.00	0.87	0.98	0.22	15.2	17.2
	2010	2.54	1.42	0.17	52.00	2.00	39.00	2.00	0.90	0.96	0.18	13.3	21.5

Table 8 (continued)

Country	Year	Public spending on families (cash)	Public spending on families (services)	Public spending on parental leave	Maternity leave	Paternity leave	Maternity paid weeks	Paternity paid weeks	HDI	GDI	GII	Women management positions	Women national parliaments
Norway	2000	1.82	1.17	0.77	9.00	2.00	142.00	4.00	0.92	0.99	0.11	20.9	36.8
	2010	1.33	1.74	0.63	9.00	2.00	135.67	10.00	0.94	1.00	0.08	38.9	39.1
Serbia	2010	–	–	–	–	–	–	–	0.76	0.96	0.22	12.4	22.4

Positions held by women in senior management and seats held by women in national parliaments; government, data obtained from EUROSTAT and data source from EIGE. The Positions held by women in senior management indicator measures the share of female board members in the largest publicly listed companies. The Seats held by women in national parliaments and governments (% of seats) indicator measures the proportion of women in national parliaments and national governments

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References

- Aguiar, M., & Hurst, E. (2005). Consumption versus expenditure. *Journal of Political Economy*, 113, 919–948.
- Aguiar, M., & Hurst, E. (2007). Measuring trends in leisure: The allocation of time over five decades. *Quarterly Journal of Economics*, 122, 969–1006.
- Aguiar, M., Hurst, E., & Karabarbounis, L. (2013). Time use during the great recession. *American Economic Review*, 103, 1664–1696.
- Aliaga, C. (2006). “How is the time of women and men distributed in Europe?” Statistics in Focus, Population and Social Conditions 4/2006. EUROSTAT. Retrieved from <https://ec.europa.eu/eurostat/web/products-statistics-in-focus/-/KS-NK-06-004>.
- Apps, P., & Rees, R. (2005). Gender, time use, and public policy over the life cycle. *Oxford Review of Economic Policy*, 21(3), 439–461.
- Bargain, O., González, L., Keane, C., & Özcan, B. (2012). Female labor supply and divorce: New evidence from Ireland. *European Economic Review*, 56(8), 1675–1691.
- Bearman, L., Raghobendra, C., Duflo, E., Pande, R., & Topalova, P. (2009). Powerful women: Does exposure reduce bias? *Quarterly Journal of Economics*, 124, 1497–1540.
- Becker, G. (1991). *A treatise on the family*. Harvard University Press.
- Bertrand, M., Kamenica, E., & Pan, J. (2015). Gender identity and relative income within households. *The Quarterly Journal of Economics*, 130(2), 571–614.
- Bettio, F., & Plantenga, J. (2004). Comparing regimes in Europe. *Feminist Economics*, 10, 85–113.
- Bettio, F., Tinios, P., & Betti, G. (2013). *The gender gap in pension in the EU*. European Commission, Directorate General for Justice, European Union.
- Bettio, F., & Verahschagina, A. (2009). *Gender segregation in the labour market: Root causes, implications and policy responses in the EU*. Publications Office of the European Union.
- Bianchi, S. M., & Milkie, M. A. (2010). Work and family research in the first decade of the 21st century. *Journal of Marriage and Family*, 72(3), 705–725.
- Bianchi, S., Milkie, M. A., Sayer, L. C., & Robinson, J. P. (2000). Is anyone doing the housework? Trends in the gendered division of household labor. *Social Forces*, 79, 191–228.
- Bianchi, S. M., Sayer, L. C., Milkie, M. A., & Robinson, J. P. (2012). Housework: Who did, does or will do it, and how much does it matter? *Social Forces*, 91(1), 55–63.
- Bick, A., & Fuchs-Schündeln, N. (2017). Quantifying the disincentive effects of joint taxation on married women's labor supply. *American Economic Review*, 107(5), 100–104.
- Bittman, M., England, P., Sayer, L., Folbre, N., & Matheson, G. (2003). When does gender trump money? Bargaining and time in household work. *American Journal of Sociology*, 109(1), 186–214.
- Boll, C., Leppin, J., & Reich, N. (2014). Paternal childcare and parental leave policies: Evidence from industrialized countries. *Review of Economics of the Household*, 12(1), 129–158.
- Browning, M., & Chiappori, P. A. (1998). Efficient intra-household allocations: A general characterization and empirical tests. *Econometrica*, 66(6), 1241–1278.
- Bryan, M. L., & Sevilla, A. (2010). Does housework lower wages? Evidence for Britain. *Oxford Economic Papers*, 63(1), 187–210.
- Burda, M., Hamermesh, D. S., & Weil, P. (2013). Total work and gender: Facts and possible explanations. *Journal of Population Economics*, 26(1), 239–261.

- Campaña, J. C., Giménez-Nadal, J. I., & Molina, J. A. (2018). Gender norms and the gendered distribution of total work in Latin American households. *Feminist Economics*, 24, 35–62.
- Cavalcanti, T., & Tavares, J. (2008). Assessing the “engines of liberation”: Home appliances and female labor force participation. *The Review of Economics and Statistics*, 90, 81–88.
- Cavalcanti, T., & Tavares, J. (2016). The output cost of gender discrimination: A model-based macroeconomics estimate. *The Economic Journal*, 126(590), 109–134.
- Chen, Z., & Woolley, F. (2001). A Cournot–Nash model of family decision making. *The Economic Journal*, 111(474), 722–748.
- Chiappori, P. A. (1988). Rational household labor supply. *Econometrica*, 56(1), 63–90.
- Chiappori, P. A. (1992). Collective labor supply and welfare. *Journal of Political Economy*, 100(3), 437–467.
- Coltrane, S. (2000). Research on household labor: Modeling and measuring the social embeddedness of routine family work. *Journal of Marriage and Family*, 62(4), 1208–1233.
- Duernecker, G., & Herrendorf, B. (2018). On the allocation of time—a quantitative analysis of the roles of taxes and productivities. *European Economic Review*, 102, 169–187.
- Esping-Andersen, G. (1999). *Social foundations of postindustrial economies*. OUP Oxford.
- European Parliament. (2015). «Maternity, paternity and parental leave: Data related to duration and compensation rates in the European Union». Retrieved from [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/509999/IPOL_STU\(2015\)509999_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/509999/IPOL_STU(2015)509999_EN.pdf).
- Fang, L., & McDaniel, C. (2016). Home hours in the United States and Europe. *The BE Journal of Macroeconomics*, 17(1), 20150031.
- Fernández-Crehuet, J. M., Gimenez-Nadal, J. I., & Dánvila del Valle, I. (2017). The international multidimensional fertility Index[®]: The European case. *Social Indicators Research*, 132, 1331–1358.
- Fernández-Crehuet, J. M., Gimenez-Nadal, J. I., & Reyes-Recio, L. E. (2016). The national work-life balance Index[®]: The European case. *Social Indicators Research*, 128, 341–359.
- Fisher, K., & Robinson, J. P. (2011). Daily life in 23 countries. *Social Indicators Research*, 101, 295–304.
- Folbre, N., & Yoon, J. (2007). What is child care? Lessons from time-use surveys of major English-speaking countries. *Review of Economics of the Household*, 5(3), 223–248.
- Fuwa, M. (2004). Macro-level gender inequality and the division of household labor in 22 countries. *American Sociological Review*, 69(6), 751–767.
- Gálvez-Muñoz, L., Rodríguez-Modroño, P., & Domínguez-Serrano, M. (2011). Work and time use by gender: A new clustering of European welfare systems. *Feminist Economics*, 17(4), 125–157.
- Gauthier, A. H., Smeeding, T. M., & Furstenberg, F. F. (2004). Are parents investing less time in children? Trends in selected industrialized countries. *Population and Development Review*, 30(4), 647–672.
- Gelber, A. M., & Mitchell, J. W. (2012). Taxes and time allocation: Evidence from single women and men. *The Review of Economic Studies*, 79(3), 863–897.
- Gershuny, J. (2000). *Changing times, work and leisure in post industrial society*. Oxford University Press.
- Gershuny, J. (2012). Too many zeros: A method for estimating long-term time-use from short diaries. *Annals of Economics and Statistics*, 105–106, 247–270.
- Gimenez-Nadal, J. I., & Molina, J. A. (2016). Commuting time and household responsibilities: Evidence using propensity score matching. *Journal of Regional Science*, 56, 332–359.
- Gimenez-Nadal, J. I., Molina, J. A., & Sevilla-Sanz, A. (2012). Social norms, partnership and children. *Review of Economics of the Household*, 10, 215–236.
- Giménez-Nadal, J. I., & Sevilla, A. (2011). The time-crunch paradox. *Social Indicators Research*, 102, 181–196.
- Giménez-Nadal, J. I., & Sevilla, A. (2012). Trends in time allocation: A cross-country analysis. *European Economic Review*, 56, 1338–1359.
- Goldstein, H. (2011). *Multilevel statistical model*. Wiley.
- Greenwood, J., Seshadri, A., & Yorukoglu, M. (2005). Engines of liberation. *Review of Economic Studies*, 72, 109–133.
- Grossbard, S., Gimenez-Nadal, J. I., & Molina, J. A. (2014). Racial intermarriage and household production. *Review of Behavioral Economics*, 1, 295–347.
- Gupta, S. (2007). Autonomy, dependence, or display? The relationship between married women’s earnings and housework. *Journal of Marriage and Family*, 69(2), 399–417.
- Hamermesh, D., & Stancaelli, E. (2015). Long workweeks and strange hours. *Industrial and Labor Relations Review*, 68, 1007–1018.
- Hersch, J., & Stratton, L. S. (1994). Housework, wages, and the division of housework time for employed spouses. *American Economic Review*, 84, 120–125.
- Hersch, J., & Stratton, L. S. (1997). Housework, fixed effects, and wages of married workers. *Journal of Human Resources*, 32(2), 285–307.

- Hersch, J., & Stratton, L. S. (2002). Housework and wages. *Journal of Human Resources*, 37(1), 217–229.
- Hewitt, B., Baxter, J., & Micklejohn, C. (2012). Non-standard employment and fathers' time in household labour. *Journal of Family Studies*, 18(2/3), 175–186.
- Himmelweit, S., Santos, C., Sevilla, A., & Sofer, C. (2013). Sharing of resources within the family and the economics of household decision-making. *Journal of Marriage and Family*, 75(3), 625–639.
- Hook, J. L. (2006). Care in context: Men's unpaid work in 20 countries, 1965–2003. *American Sociological Review*, 71(4), 639–660.
- Hook, J. L. (2010). Gender inequality in the welfare state: Sex segregation in housework, 1965–2003. *American Journal of Sociology*, 115(5), 1480–1523.
- Hook, J. L., & Wolfe, C. M. (2012). New fathers? Residential fathers' time with children in four countries. *Journal of Family Issues*, 33(4), 415–450.
- Hook, J. L., & Wolfe, C. M. (2013). Parental involvement and work schedules: Time with children in the United States, Germany, Norway and the United Kingdom. *European Sociological Review*, 29(3), 411–425.
- Hsie, C-T, Hurst, E., Jones, C.I., & Klenow, P. J. (2013). The allocation of talent and U.S. economic growth. NBER working paper N° 18693.
- International Monetary Fund. (2009). World economic outlook: Crisis and recovery, April 2009. Retrieved from <https://www.imf.org/en/Publications/WEO/Issues/2016/12/31/World-Economic-Outlook-April-2009-Crisis-and-Recovery-22575>.
- Kalenkoski, C. M., & Foster, G. (2015). Measuring the relative productivity of multitasking to sole-tasking in household production: Experimental evidence. *Applied Economics*, 47(18), 1847–1862.
- Kalenkoski, C. M., & Foster, G. (Eds.). (2016). *The economics of multitasking*. Springer.
- Kalil, A., Ryan, R., & Corey, M. (2012). Diverging destinies: Maternal education and the developmental gradient in time with children. *Demography*, 49(4), 1361–1383.
- Karu, M., & Tremblay, D. G. (2018). Fathers on parental leave: An analysis of rights and take-up in 29 countries. *Community, Work & Family*, 21, 344–362.
- Lachance-Grzela, M., & Bouchard, G. (2010). Why do women do the lion's share of housework? A decade of research. *Sex Roles*, 63(11–12), 767–780.
- Lundberg, S., & Pollak, R. (1993). Separate spheres bargaining and the marriage market. *Journal of Political Economy*, 101(6), 988–1010.
- Lundberg, S., & Pollak, R. (1996). Bargaining and distribution in marriage. *Journal of Economic Perspectives*, 10(4), 139–158.
- Manser, M., & Brown, M. (1980). Marriage and household decision making: A bargaining analysis. *International Economic Review*, 21(1), 31–44.
- McElroy, M. B., & Horney, M. J. (1981). Nash bargained household decisions. *International Economic Review*, 22(2), 333–349.
- Nardo, M. M., Saisana, A., Saltelli, T. S., Tarantola, S., Hoffman, A., & Giovannini, E. (2008). Handbook on constructing composite indicators: Methodology and user guide. OECD, European Commission, Joint Research Centre. <http://composite-indicators.jrc.ec.europa.eu/Handbook.htm>
- National Bureau of Economic Research. (2010). Business Cycle Dating Committee, latest announcement dated 9/20/10. <http://www.nber.org/cycles.html#announcements>
- OECD (2018). Unemployment rate/ Part-time indicators, OECD online statistics. <https://data.oecd.org/emp/part-time-employment-rate.htm>
- Ragan, K. S. (2013). Taxes and time use: Fiscal policy in a household production model. *American Economic Journal: Macroeconomics*, 5(1), 168–192.
- Risman, B. (1998). *Gender as structure. Gender Vertigo: American families in transition* (pp. 292–299). Yale University Press.
- Sayer, L. (2005). Gender, time and inequality: Trends in women's and men's paid work, unpaid work and free time. *Social Forces*, 84, 285–303.
- Sayer, L. (2007). More work for mothers? Trends and gender differences in multitasking. In T. van der Lippe & P. Peters (Eds.), *Time competition: Disturbed balances and new options in work and care* (pp. 41–56). Edward Elgar.
- Sayer, L. C., England, P., Bittman, M., & Bianchi, S. M. (2009). How long is the second (plus first) shift? Gender differences in paid, unpaid, and total work time in Australia and the United States. *Journal of Comparative Family Studies*, 40(4), 523–545.
- Seguino, S. (2007). PlusÇa change? Evidence on global trends in gender norms and attitudes. *Feminist Economics*, 13(2), 1–28.
- Sevilla-Sanz, A. (2010). Household division of labor and cross-country differences in household formation rates. *Journal of Population Economics*, 23, 225–249.

- Sevilla, A., Gimenez-Nadal, J. I., & Fernandez, C. (2010). Gender roles and the division of unpaid work in Spanish households. *Feminist Economics*, *16*, 137–184.
- Silver, H., & Goldscheider, F. K. (1994). Flexible work and housework: Work and family constraints on women's domestic labor. *Social Forces*, *72*(4), 305–327.
- Stancanelli, E. (2017). Couples' retirement under individual pension design: A regression discontinuity study for France. *Labour Economics*, *49*, 14–26.
- Van Belle, J. (2013). *Paternal and parental leave policies across the European Union*. Rand Europe.

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