Inequality in parental time with children:
Trends by gender and education between 1961 and 2011 across 20 countries.

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Abstract

This paper investigates dynamics of inequality in parental child-care time with children using data from the Multinational Time Use Study across 20 countries. Using the Gini coefficient as a summary measure of inequality in the use of time at the country level we ask the following two questions: how has inequality in parental time with children evolved over time? To what extent is such inequality driven by inequality in parental time by gender and socio-economic status? Our findings suggest that inequality in paternal time has been higher than inequality in maternal time throughout the last half-century. The gap has narrowed over the last decade because inequality in maternal time with children has remained constant, whereas that in paternal time has slightly decreased. In addition, the Gini coefficient among low-educated parents started to be consistently higher than that of high-educated parents since the 1970s, exhibiting a widening educational gap for fathers (but not mothers) over time. We also find that inequality in parental time with children is positively correlated with the Gini index on disposable income and the poverty ratio, and negatively correlated with enrolment in pre-primary school and family policy expenditure. As these factors are all indicative of the extent to which children face equal opportunities, our findings suggest that the way private and public financial resources are distributed tends to reinforce (rather than compensate) inequality in time spent with children, thus posing a threat to the ideal of a level playing field.

Keywords: time use, inequality, maternal and paternal time with children; Gini coefficient, Multinational Time Use Study

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1. Introduction

Existing literature has consistently shown that starting from the 1960s, and especially since the 1980s, the average parental time spent in childcare activities has increased substantially across the advanced industrialized countries (e.g., Gershuny 2000; Bianchi 2000; Sandberg and Hofferth 2001; Gauthier et al. 2004). At the same time, there has been a growing recognition that time investment in children, particularly at early ages, has significant life-long consequences, as it affects children's skill development and human capital accumulation process, as well as their psychological well-being (Coleman 1988; Nock and Kingston, 1988; Amato and Gilbreth 1999; Lareau 2011; Putnam 2015; Fiorini and Keane 2014). However, many studies have provided evidence of the fact that the increase in the amount of time spent with children has been very heterogeneous, substantially varying by gender (Craig and Mullan 2011; Bianchi, Robinson, and Milkie 2006) and socio-economic status (SES) of parents (Monna and Gauthier 2008; Altintas 2016).

So far, gender (mothers versus fathers) or SES (widely measured using parental education) divides in parental time with children have been identified comparing the average time of these groups. Although such comparisons between the groups' mean parental time already suggest relevant across-group inequality (Schneider et al. 2018), this paper aims at shedding further light on dynamics of inequality in the amount of time parents spend with their children. We are interested in uncovering the extent and evolution of inequality in parental time with children focusing on the overall distribution of child-care time of the population of parents. To examine that, we use the Gini index, a synthetic indicator of inequality widely used on income and wealth, that we apply to parental time with children. Inequality in the distribution of time is influenced not only by across-group inequality (e.g., the difference between average time devoted to children by high- and low-educated parents), but also by within-group inequality (e.g., how large the differences in parental time among those with a given level of education are), as well as by the shares of the different groups in the overall population. Therefore, we specifically aim at addressing two main research questions: How has inequality in parental time with children evolved over time? To what extent is such inequality driven by inequality in parental time by gender and SES?

There is evidence that mothers continue to be the ones devoting more time to childcare than fathers (Sayer and Gornick 2011; Craig and Mullan 2018), although paternal time with children has substantially increased over time (Bianchi, Robinson, and Milkie 2006; Sullivan, Billari and Altintas 2014). The fact that the gender gap in parental time with children is still present has been explained partially by a slow and uneven increasing participation of fathers in childcare (Bianchi, Robinson, and Milkie 2006), but also by the evidence that mothers have as well increased their average child-care time (Hays 1998; Craig and Mullan 2018). Together with an increase in gender equality within the household, as claimed by the gender revolution framework (Goldscheider 2010; Goldsheider et al. 2015), there has been a change in the idea of what is "good parenting" and thereby in the importance that parents attach to investments in children (Schneider et al. 2018). Studying these dynamics not only by looking at average parental time, but also by examining inequality of time investments' in children within the two groups of mothers and fathers may provide new empirical evidence on how the gender revolution has unfolded over time

for men and women (Goldscheider 2010; Goldsheider et al. 2015) and shed further light on parenting practices preferences (Schneider et al. 2018).
The fact that more-educated parents spend more time with their children (Altintas 2016; Craig and Mullan 2010; Leibowitz 1974; Guryan, Hurst and Kearney 2008; Monna and Gauthier 2008; Sayer, Gauthier and Furstenberg 2004), especially in human capital enhancing activities (Altintas 2015; Hofferth and Sandberg 2001; Bianchi and Robinson 1997), and that the educational gap in average parental time is growing (Altintas 2016; Sullivan 2010; Ramey and Ramey 2010) is a potential threat to equal opportunities, being a way to transmit advantage or disadvantage across generations. Indeed, this evidence, along with other recent demographic trends such as the increase in marital dissolution - which play at the disadvantage of low SES children - have led some scholars to speculate that the observed rising average parental time with children might be "masking greater heterogeneity among parents than in the past" (Sayer, Bianchi and Robinson 2004: 32), "concealing possible polarization of parents," (Monna and Gauthier 2008: 647) and, therefore, potentially contributing to "diverging destines" of children (McLanahan 2004). By investigating inequality in parental time with children not only across different socio-economic groups of parents, but also within groups with a given level of education, we can uncover whether social stratification dynamics in children investments are mainly driven by inequality in parental time characterizing a specific socio-economic group of the population of parents.

Existing literature shows no consensus on the relationship between income inequality and SES divide in parental investment. While some studies suggest that the higher the income inequality the larger is the SES divide in parental investment in terms of time and money (Duncan and Murnane 2011; Kalil 2014; Kornrich and Furstenberg 2013; Schneider et al. 2018), some other pieces of research prompt to the contrary conclusion (Kalil et al. 2016; Reardon and Portilla 2016). This study aims at further exploring the relationship between inequality in parental time, measured using Gini index calculated on the overall distribution of parental time by country, and income inequality. We actually take a broader perspective, and investigate whether inequality in parental time with children is positively or negatively associated with different forces that may threaten the achievement of a level playing field, by increasing intergenerational transmission of advantages. High income inequality and high poverty rates, low level of public expenditure on families, or low enrollment rates in pre-primary education are some potential factors. The present paper explores the correlation between inequality in parental time and these indicators. If inequality in parental time is positively associated with these forces, that tend to favor the intergenerational transmission of advantages, it may further amplify threats to equality of opportunity for children.

This study contributes to the existing literature by adopting a theoretical and empirical approach that examines the inequality of parental time with children focusing on the overall distribution of child-care time of the population of parents, and not simply on the comparison between the average parental time of different groups in the population. We study inequality in the distribution of parental time not only looking at across-group inequality, but also at within-group inequality. From a theoretical point of view, we elaborate on the potential mechanisms that may explain raising or decreasing inequality in parental child-care investment over time for mothers and fathers, and for low- and high- SES parents. From an empirical point of view, we use the Gini index to capture the extent and evolution of inequality in parental time with children. This

application of the Gini Index on parental time with children is quite novel. To the best of our knowledge, Gimenez-Nadal and Sevilla-Sanz (2012) were the only ones who used the Gini index to measure inequality in time use, but the focus was on leisure time only, rather than on child-care time. We pool information on the Gini index calculated on the distribution of parental time at the country-level, and, by using Multinational Time Use Study (MTUS) for the last five decades in 20 countries, we document how inequality in parental time with children has evolved over time, across and within socio-economic groups as well as gender (i.e., mothers and fathers). We additionally contribute to the existing literature by further exploring the relationship between inequality in parental time and different forces that may threaten the achievement of a level playing field for children. While existing studies have already investigated in various ways the relationship between parental investment in children and income inequality (e.g., Schneider et al. 2018), we take a broader perspective and aim at identifying whether different drivers of social inequality reinforce each other. We therefore explore potential associations of inequality in parental child-care time with factors that could favour the intergenerational transmission of advantages, such as public expenditure on families, or enrollment rates in pre-primary education at the country level.

2. Theoretical framework

Previous research has consistently shown that the average time spent in primary childcare activities by parents has increased since the 1960s and even more substantially starting from the 1980s across advanced industrialized countries, such as the US (Altintas 2016, Bianchi, Robinson and Milkie 2006; Chalasani 2007; Sayer, Bianchi and Robinson 2004), the Netherlands (Bianchi, Robinson, and Milkie 2006), Canada (Zuzanek 2001; Gauthier, Smeeding and Furstenberg 2004), the UK (Sayer, Bianchi and Robinson 2004), and Australia (Bittman 1999, 2004; Craig, Powell and Smyth 2014). Findings from Gershuny's (2000) analysis on 20 countries, those of Gauthier, Smeeding and Furstenberg (2004) on 16 countries, and Guryan, Hurst and Kearney (2008) on 13 countries confirmed the trends in increased childcare time, especially since the 1980s.

The observed increase over time in the parental child-care time has highlighted substantial differences by gender and SES of parents. Let us first focus on gender differences. Although many studies show that the average paternal time with children has substantially increased in the last decades (Fisher, McCulloch, and Gershuny 1999; Bianchi 2000; Bianchi, Robinson, and Milkie 2006; Sullivan, Billari and Altintas 2014), mothers are still the ones devoting more time on average to childcare, especially to routine and physical activities (Gauthier, Smeeding and Furstenberg 2004; Craig and Mullan 2011). The fact that fathers' time has not reached parity with mothers' time is due to an uneven increase in paternal child-care time, that has raised differently in different countries (Craig and Mullan 2011) and has been driven mainly by highly educated fathers (Sullivan, Billari and Altintas 2014). Moreover, there is clear evidence that also mothers' time with children has increased over time (Hays 1998; Craig and Mullan 2018). In light of the presence of more well-established and widely agreed gendered norms on motherhood than on fatherhood, we expect *a relatively less unequal, that is more homogeneous, distribution of childcare time among mothers than among fathers (H1)*. It is very unlikely for a mother living with a young child to do very little or no regular caregiving. Almost all mothers, therefore,

provide a certain amount of regular basic care. Substantial divergence from that social norm is not observed very often. In the case of fathers, however, the parenting behaviour is more likely to be diverse, depending on gender norms surrounding fatherhood, and understanding of the role of parenthood. Father's daily care practices, therefore, are more heterogeneous than those of mothers.

However, starting from 1960s, women have increasingly been involved in the labor market, thereby experiencing the "second shift" (Hochschild and Machung 1989), that is the dual burden of work and family. The phenomenon of the increasing women' participation in the labor market that has not being accompanied by a substantial relief from their family responsibilities has been framed as the "first half" of the Gender Revolution (Goldscheider 2010; Goldsheider et al. 2015). Although mothers have kept being highly involved physically and emotionally in childcare even when employed, there is some evidence that working mothers devote less time to childcare due to reduced time availability (Presser 2003; Gauthier et al. 2004). Therefore, building on the time-availability framework (Presser 2003) and due to an increasing heterogeneity in the involvement of women in the labor market, we consequently expect that *inequality of parental time with children among mothers has increased over time (H2).*

The increasing men's involvement in the household sphere has instead been defined as the "second half" of the Gender Revolution, which however is still underway in many countries (Goldsheider et al. 2015). A growing number of fathers have embraced gender equality and consider "caregiving" as an essential part of fatherhood. In the more recent period, there has been a substantial change in attitudes towards fatherhood. The role of a "good father" is no longer limited to being the breadwinner of the family, the gender role model, or the moral authority (Lamb and Tamis-Lemonda 2003; Wall and Arnold, 2007; Lamb 2010, Pleck 2003). Fathers are now expected to spend time with their children, actively contribute to the family life, and be involved in parenting. The spread of the "involved father" ideal might lead to a more homogenous parenting pattern in terms of time with children for fathers. We therefore anticipate that *inequality of parental time with children among fathers has decreased over time (H3).* This more homogenous parenting style is likely driven by a change in the decision to devote time to children, i.e. more fathers are involved in childcare (extensive margin effect) than before, when many of them were not involved at all.

Let us now turn to educational differences in the time spent with children by parents. Existing literature has clearly shown that, on average, highly educated parents devote more time to children (for qualitative work see Hays (1996) and Lareau (2011) in the United States and Domìnguez-Folgueras et al. (2017) in Spain; quantitative studies supporting the same evidence are, for instance, those of England and Srivastava (2013) in the US and Gracia (2015) in UK). Educational inequalities in parental child-care time have so far been identified comparing the average time spent with children by high- and low-educated parents. We postulate that such inequalities might also be driven by a different degree of heterogeneity in parental child-care time within the two educational groups of parents. Concerted cultivation norms and intensive parenting norms are likely to be much more well-established among highly educated mothers and fathers (Bianchi and Robinson, 1997; Gracia and Garcìa-Romàn 2018), making the parenting practices within this group of parents more homogenous than that of lower-educated parents.

Therefore, we expect that *inequality in parental child-care time is lower among highly-educated parents than lower-educated parents (H4).* In addition, we explore educational inequalities in parental time with children by gender, that is, separately for mothers and fathers. We do so because we expect potential *increasing inequality over time for the group of lower-educated fathers (H5).* Our hypothesis is based on the evidence that the spread of new norms about fatherhood, that the Gender Revolution has brought about, is still uneven and underway for low educated fathers (Sullivan, Billari and Altintas 2014).

In light of the fact that parental time investment affects children's skill development and the human capital accumulation process, as well as their psychological well-being (Coleman 1988; Nock and Kingston, 1988; Amato and Gilbreth 1999; Lareau 2011; Putnam 2015; Fiorini and Keane 2014), we are interested in exploring whether inequality in parental time with children move in concert with inequality in other socio-economic dimensions. Schneider and colleagues (2018) have not found a significant association between social class divide (measured using parental income and education) in parental time and income inequality in the US. We explore that further by taking a comparative perspective and a broader approach, that also looks at other dimensions indicative of the extent to which children face equal opportunities: poverty rate, public expenditure on families and enrolment in pre-primary education. High income inequality signals that not all children have potentially access to a similar amount of financial resources. High poverty rates suggest that larger shares of children face, for instance, poor health and limited access to education. Moreover, whenever public expenditure on families cannot complement private resources, it cannot help reducing differences across households and pursuing redistributive objectives. Finally, early child-care and pre-primary education are important tools to promote equal opportunities for children: the higher the number of children enrolled, the larger the group exposed to a homogeneous care environment. We aim at uncovering how concerning inequality in parental time is by investigating how such inequality combines with these factors that matter for promoting a level playing field.

3. Data and methodology

The time use data that form the base of this study come from the Multinational Time Use Study (MTUS), a collection of harmonised time use diary surveys based on samples from over 20 countries from the early 1960s to the 2000s.[5] With six additional surveys from the 2006-2011 period (Canada, Finland, France, Italy, Spain and US), we use the largest and most up-to-date time diary evidence. Time-diary methodology provides reliable and accurate information on daily time-use patterns, especially if the duration of the activities is not institutionally controlled such as with child care (Chenu and Lesnard 2006; Kelly et al. 2015). Unlike stylised survey questions, where the respondents are required to remember the total amount of time spent on or frequency of an activity, diarists contemporaneously self-describe their 24 hours without being prompted about specific activities. The diary method, therefore, is less prone to recall error or social desirability response bias (Bianchi, Robinson and Milkie 2006; Gershuny 2000; Harvey 1993; Juster and Stafford 1985; Robinson and Godbey 1999; Kan 2008). Social desirability bias

[5] Australia, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Israel, Italy, Netherlands, Norway, Poland, Spain, Sweden, United Kingdom, United States, Yugoslavia/Slovenia. More information on the data used are available at: http//www.timeuse.org

is particularly strong when reporting developmentally salient child-care activities (Hofferth 2006) and thus, time diary evidence is especially appropriate to examine trends in child care.

All the surveys in the MTUS apply the time-diary methodology; time expenditure and background variables are harmonised to a common format. Weights are applied to account for daily and seasonal variations, as well as underrepresentation of certain demographic groups (Fisher and Gershuny, 2013). These characteristics make MTUS a powerful data source, widely used across disciplines for cross-national comparative research (see for example, Hook 2011 on gender division of labour, Guryan, Hurst and Kearney 2008 and Gauthier, Smeeding and Furstenberg 2004 on time investment in children, Andersen, Curtis and Grabb 2006 on social capital and volunteering; and Ng and Popkin 2012 on physical activity and energy expenditures). However, there is considerable methodological variation in MTUS surveys that needs to be highlighted (Full list of countries by technical information can be found in Table 1.2 in Fisher and Gershuny, 2013). First, surveys in MTUS vary in their time intervals. The length of slot diarists report their activities in changes between free, 1, 5, 10, 15 or 30 minutes, 10 or 15 minutes being the most common interval. Second, the number of diary days differ. While most surveys collect one- or two-day diaries (1 weekday 1 weekend), all Dutch surveys and four of the earliest UK surveys are 7-day diaries. US 1975 is a four-day survey and Germany 2001 and Norway 1971 have three-day diaries. Third, surveys differ in their sampling methodologies and age of population covered. Some surveys (e.g. US) sample one member per household, whereas others sample all household members older than a certain age (commonly 15). Finally, fieldwork often takes place through the year, but in some cases it is shorter than 12 months (e.g. 6 months in Israel 1991 and 9 months in Sweden 1991). Survey period in the Netherlands is October. The first two of the listed issues, varying time intervals and window of observation, are the most relevant to this research, because the minimum time the respondent can report an activity and the number of diary days affect the number of individuals reporting zeros, i.e. no participation to a given activity (see also Hook 2006). We have performed robustness tests by randomly selecting one weekend and one weekday from each surveys and replicating the analysis. The results show that trends presented in Section 3 are not driven by the number of diary days. More generally, notwithstanding the potential bias in the measurement of inequality arising from varying time intervals and window of observation, MTUS is the best data source to address our questions.

In order to use all the available information, we included as many surveys as possible from the countries of interest in our analysis. Of the eight surveys conducted in 1965 and coming from Szalai Multinational Comparative Time Budget Research Project, only two (Belgium and Germany) are nationally representative random sample surveys. In the six other cases (Bulgaria, Czechoslovakia, Hungary, Poland, US and Yugoslavia) the sample is drawn from one or several small to middle-size towns and is limited to households in which at least one member was employed in the non-agricultural sector (Fisher and Gershuny 2013). Therefore, the figures from the 1960s should be interpreted with caution.

The sample of the study is limited to married or cohabiting men and women aged between 19 and 50 years who live with at least one child under the age of 5 in the household. The sample is limited to parents of young children for theoretical and data-related reasons. First, time spent in primary child care is especially high during the pre-school period when children are more reliant

on adult care. Second, this is the period where parental time investment is particularly salient for children's cognitive and social skill development. Third, having a child under the age of 5 is the most common cut-off point, which minimises the problem of lack of comparability across surveys.[6] Because of data limitations, in our analysis we cannot control for the number of children: therefore, our measure of childcare time refers to the overall time provided by a parent to her/his children and not to the time received by each child. Moreover, the data does not provide information on the relationship between the child and the respondent: thus, we use women and men living with a child in the same household as proxies for mothers and fathers.

We focus on child care as primary activity. This refers to the total minutes spent in all forms of child-care activities (e.g., changing diapers, reading to a child, etc.) and reported as the main activity at a specified time on a given diary day. Limiting the focus on child care as a primary activity ignores more passive forms of child care; hence, it is likely to underestimate the total caregiving time (Budig and Folbre 2004; Folbre and Yoon 2007; Zick and Bryant 1996). However, MTUS does not have comparable data on secondary child-care activities. Furthermore, for the purpose of investigating trends in parental time investment, keeping the focus on primary care activities is preferable because primary child care captures the total time during which the child is the main centre of attention and direct recipient of parents' time investment.

To provide a summary measure of the inequality inherent in the distribution of parental time with children we use the well-known Gini coefficient (Gini, 1909). The Gini coefficient is widely used as an indicator of inequality in income and wealth. We here adopt it to capture the extent and the evolution of inequality in time investment within a country.[7] The coefficient ranges from 0 to 1, with 1 indicating the maximum degree of inequality and 0 denoting a situation in which there is no inequality. There are many equivalent definitions of the Gini coefficient (Yitzhaki, 1998): the most common one relates Gini to the Lorenz Curve. The Lorenz curve is a graphical device for a summary representation of a distribution. The graph of the Lorenz curve has the cumulative proportion of population on the horizontal axis and the cumulative proportion of an attribute (e.g. income, wealth or, in our case, time) on the vertical axis. Points on the Lorenz curve tell us, for instance, that the bottom 30% of the population has 20% of the attribute under exam. When all the units in the population have the same value of the attribute, the Lorenz curve is the 45 degree line and one refers to it as the line of perfect equality. The Gini coefficient is the ratio of the area between the line of perfect equality and the Lorenz curve, over the area of the triangle below the line of perfect equality. In our context, the Gini coefficient would be equal to 0 if all parents within a country give the same number of minutes to children; it would be equal to 1 if only one parent gives a positive amount of time to his/her children and all the other parents give zero time in the given country.

To explore the association between inequality in parental time with children and factors affecting equality of opportunity, for each country-year we calculate: the Gini coefficient for the

[6] Indeed, the age of youngest child as a continuous variable is not available in a number of surveys, especially in early ones. Early surveys are more likely to have this variable as a categorical variable with different cut-off points and the category child under 5 is present in all the surveys.

[7] We have also calculated the Theil Index and the mean log deviation as alternative inequality indices and the qualitative patterns are broadly consistent across these three different measures.

distribution of maternal and paternal time with children using the MTUS dataset; the Gini coefficient on the distribution of disposable income (source: OECD and LIS); GDP per capita in US dollars in purchasing power parity at constant 2010 prices (source: OECD); the poverty ratio, where the poverty line is set at 50% of median income (source: World Bank); the mortality rate under 5 (source: World Bank); public expenditure on families as a share of GDP (source: OECD), and the enrolment ratio in pre-primary schooling (source: UNESCO). We then compute the Pearson correlation and the partial correlation between the Gini coefficient on the distribution of childcare time for mothers and fathers and each of the indicators described above.

4. Results

4.1 Inequality in parental time by gender and education

We first assess the extent of inequality in parental time by gender. For each country in our sample we compute the Gini coefficient on the distribution of child-care time, by decade, distinguishing between mothers and fathers. Figure 1 shows the results, with data interpolated using both a LOESS curve and a linear regression line. Table 1 reports the values of the Gini coefficients for each country in the sample for which we have more than one data point,[8] together with the mean and the median of the distribution of time devoted to children within each country, by decade.[9]

[FIGURE 1 ABOUT HERE]

As Figure 1 shows, inequality in child care has always been higher among fathers than mothers. As Table 1 makes clear, this also holds within each country. This confirms the validity of our hypothesis H1. For fathers, the Gini coefficient ranges from 0.9 in the UK in the 1960-1970 period to a minimum of 0.53 in Norway in the period 2000-2005. For mothers, the highest value of the Gini is registered in Bulgaria in the earliest period (0.79) and the lowest is for France in the same period (0.32).[10] Note that these values are much higher than those observed for the Gini coefficient calculated on income. These higher values come from the larger number of parents who do not participate in childcare, especially in the earlier decades, compared to the number of individuals with zero income. We believe that the lower inequality in maternal child-care time with respect to paternal time is likely due to the presence of gendered norms on parenthood that

[8] This excludes Belgium, Czechoslovakia, Denmark, Israel, Yugoslavia/Slovenia and Sweden.

[9] Though the focus of the paper is inequality, we calculate mean and median time within countries to compare our results with existing evidence. We find that, with a single exception of French mothers, mean and median care time have increased substantially for both parents throughout the period. Six additional surveys from the most recent period (2006-2011) allow us to split the 2000s into two and have a better picture of the trends in the last decade for Canada, Italy, Spain and the US. Our findings are in line with previous research in showing a substantial increase in mean parental care time in the US between the 1960s and early 2000s. In the most recent period (2006-2011), however, maternal care time seems to have plateaued, whereas fathers' care shows a modest increase of five minutes. Canadian and Italian parents, on the other hand, continue to increase their childcare in the second half of the 2000s. In the case of Spain, we observe stability in maternal care but a large increase (25 minutes) in fathers' care in the last decade.

[10] One may note that the Gini coefficient for mothers in the Sixties in Bulgaria is very high compared to other periods and other countries. This result reflects the compulsory paid employment of women under communist regime. About 90% Bulgarian mothers with a child under 5 in the sample of the Sixties are full-time employed (that figure drops to 30 % in 2001). This implies a very low participation rate of Bulgarian mothers to childcare (only 40%) and a very high Gini coefficient. Note that average participation rate in childcare by mothers is 93% in the entire sample (all periods, all countries). Dropping the Bulgarian data for the Sixties does not affect our results.

expect mothers to be the main caregiver or at least to engage in intensive parenting, more than fathers (Lareau, 2011).

Second, consistently with our hypotheses H2 and H3, Figure 1 and Table 1 show that inequality in care time among mothers has been stable in the last five decades, whereas there has been a decline in the case of fathers. To explain this pattern, in Figure 2 we present the distribution of parental time with children by gender and over time. The data clearly show that the share of those not participating in child care activities, i.e. those devoting zero minutes, has reduced over time, drastically so for fathers. Different participation patterns influence the Gini coefficient: in particular, Figure 3 displays the relationship between the Gini coefficient and the percentage of parents who report time devoted to children, irrespective of the specific number of minutes provided. In other words, it shows the relationship between the share of parents providing a positive amount of child care to their children and inequality as measured by the Gini index. We find that there is a negative relationship between the Gini coefficient and the share of mothers and fathers devoting time to their children. This negative correlation is much stronger for fathers, suggesting that the pattern of decreasing inequality over time for fathers can be partly driven by the change in the decision to devote time to children and by the increase in the number of participant fathers.

[FIGURE 2 AND 3 ABOUT HERE]

Figure 4 shows the pattern of inequality in parental time by educational level. We observe that inequality in parental time has been higher for low educated parents than for high educated ones starting from the 70s, highlighting that children of high educated parents not only enjoy on average more time with their parents, as shown in the existing literature (Hill and Stafford 1973, 1985; Leibowitz 1974; Gronau 1977), but are also exposed to a lower variability in the time they receive.[11] This provides evidence in favour of our hypothesis H4.

[FIGURE 4 ABOUT HERE]

Finally, in Figures 5 and 6, we look at inequality in parental time both by gender and educational level. First, we note that inequality among college- and non-college-educated mothers shows a stable trend, whereas for all fathers it declines until the 1990s, when it reaches a minimum. In the last decades, inequality is stable for college-educated fathers, whereas it seems to be on the rise for low-educated ones.[12] This is novel evidence on the behaviour of inequality within the high- and low-educated groups of fathers and mothers, and it points in the direction of a recent increase in inequality among low-educated fathers, where a more homogenous parenting style struggles to emerge. This is in line with hypothesis H5.

[FIGURE 5 AND 6 ABOUT HERE]

[11] Early Hungarian data have no information on educational attainment and therefore Hungary is removed from the sample used to study trends by education.
[12] Inequality in time investment in children is highest among low-educated American parents.

4.2 Association between inequality in parental time with children and factors affecting equality of opportunity

Although inequality is either stable or declining over time when assessed on the overall population of mothers and fathers, this is not the case for low-educated fathers. In addition, it is consistently higher for low-educated parents than for high-educated ones. How concerning inequality in parental time is depends on how such inequality combines with other factors that have been shown to matter for guaranteeing equal opportunities to children. Thus, we now investigate the relationship between inequality in child-care time and other forces which could promote a level playing field. Low income inequality and poverty, high level of public expenditure on families, and high enrollment rates in pre-primary education are indicators of the quality of the early childhood environment and of the different opportunities open to children. As argued by Atkinson (2015), the income inequality of today directly affects the equality of opportunity of the next generation, and therefore it shapes tomorrow's playing field. The lower income inequality is, the more likely it is that children face a level playing field. Poverty is another important constraint on children's opportunities – not by chance ending poverty is listed as first among the UN sustainable development goals. Public expenditure on families complements private resources and can reduce differences across households, especially when it pursues redistributive objectives. As highlighted by the Europe 2020 strategy, early child care and pre-primary education are important tools to promote equal opportunities for children, beside complementing the parental labour supply. The higher the number of children enrolled, the larger the group exposed to a homogeneous care environment.

We study the correlation between inequality in maternal (paternal) time spent with children and the above indicators as a way to assess how concerning inequality in parental time with children is. If high inequality in maternal (paternal) time correlates with high income inequality and/or high poverty and/or low public expenditure on families and/or low enrolment rate in pre-primary schooling, then the threat to equal opportunities is likely to be more severe. We also include in the analysis GDP per capita and the mortality rate of children under 5 as broad measures of a country well-being. Finally, we correlate inequality in maternal time with that in paternal time, to investigate whether high inequality among fathers may be offset by low inequality among mothers.

As shown in Table 2, we find a positive and significant relation between the Gini index on maternal and paternal time devoted to children and two of the income-related variables, i.e. the Gini index on disposable income and the poverty ratio. Moreover, there is a positive correlation between the Gini index of paternal time and that of maternal time. All these positive correlations suggest that different forms of inequality reinforce each other. On the contrary, we find a negative and significant relationship between, on the one hand, the Gini index on the distribution of time devoted to children and, on the other hand, public expenditure on families and the enrolment ratio in pre-primary schooling. These negative correlations hold for both mothers – for whom the correlation is mostly driven by the US - and fathers, with the exception of the one with the enrolment ratio in pre-primary schooling, which is not significant in the fathers' sample. In countries where families receive more public resources and where children are more involved in

formal care, inequality in parental time inputs is lower: where the public involvement is weaker, also the home environment is less effective in creating equal opportunities for children.

[TABLE 2 ABOUT HERE]

4. Conclusions

This article contributed to the existing literature by providing new theoretical insights and further empirical evidence on inequality of parental time with children. We aimed at investigating trends in inequality in parental child-care time in the last five decades, across 20 countries. We examined relevant gender and educational divides, elaborating on potential mechanisms that may explain raising or decreasing inequality in parental child-care investment over time for mothers and fathers, and for low- and high- SES parents. We do not simply look at the comparison between the average parental time of different groups in the population, but we focused on the overall distribution of child-care time of the population of parents, which depends not only on across-group inequality, as implicitly assumed by the existing literature, but also on within-group inequality and on the dynamics of groups' size. . We calculated the Gini index on the distribution of parental time at the country-level between 1961 and 2011 using the Multinational Time Use Study (MTUS). Moreover, we investigated the extent to which countries can offer equal opportunities to their young generations by correlating the Gini coefficient of the distribution of parental time with other indicators potentially affecting the quality of childhood environments.

In elaborating on the mechanisms driving inequality in parental time with children, we showed that inequality in paternal time in the last half-century has always been higher than that in maternal time, though the gap has narrowed over the last decade. Decreasing inequality in paternal time is likely associated to the fact that there has been a change in attitudes towards fatherhood: more and more fathers welcome gender equality and consider "caregiving" as an essential part of fatherhood. However, this change in attitudes and behaviours seems confined to more-educated fathers: inequality among low-educated parents is consistently higher than that among high-educated parents –with the exception of the very early years of our sample- and, in the case of fathers, the difference is increasing. Starting from the late 1990s, the Gini coefficient for low-educated fathers has been on the rise, whereas the Gini for high-educated fathers has declined. This is indicative of further dispersion within the low-educated father group. Furthermore, our findings provide a conservative estimation of the problem, due to the exclusion of children living in single-parent households from the analysis. The decline in paternal inequality in time investment in children in recent periods, for example, does not reflect the missing care time due to rising number of non-residential fathers, particularly in low-educated households.

Clearly, the extent to which inequality in child-care time is a concern for equal opportunities depends on how parental time inequality correlates with other measures of the quality of early environments. We showed that the Gini index of parental time devoted to children is positively correlated with the Gini index on disposable income and the poverty ratio, and negatively correlated with the enrolment in pre-primary school, as well as family policy expenditure. This indicates that the way both private and public financial resources and access to services are

distributed does not compensate the inequality in parental time with children, but rather reinforces the threat to equal opportunities for children.

Of course, institutional differences are crucial when drivers of social inequality are investigated. For example, the US stands out as a particularly challenging environment to grow up, especially for children born to low-educated parents. Although time spent in childcare by mothers and fathers in the most recent period is on a par with other countries, inequality in time investment in children is consistently higher in the last decade in comparison to others. Furthermore, the US is the only advanced country that until very recently had no universal maternity leave or public child-care provision. Both maternity leave policies and childcare provision could work as homogenising forces in parents' behaviour, and their absence may in part be responsible for the high inequality in time observed in the US. Children born to low-educated parents in the US, therefore, are living in an environment where average child-care time is low, inequality is high, and public insurance/support is hardly available. The role of institutional heterogeneities in shaping parental time with children should be definitely further investigated and could very well be a direction for further research.

Our study has other limitations that lay the ground for subsequent research. First of all, these results are for total time spent in child care as primary care. This covers all types of care activities, where child care is the main one. Yet, previous research shows that some developmental child-care activities (e.g., reading books to children) are more likely to be related with positive behavioural and cognitive outcomes than others (physical care). Many of the surveys used in this paper, however, do not have developmental care time as a specific activity category. With the future releases of MTUS it will be possible to investigate the distributional aspects of specific time investments. Second, the study is limited to maternal and paternal time only. We do not look directly at other types of time investment in children (e.g., other family members, time spent in child care facilities, etc), since we focus on the changes in parental time and capture external child care provision only by considering aggregate data on enrolment in pre-primary education. Looking more in detail at the role of other potential providers of care is an interesting future extension. Third, because of data limitations, our measure of child-care time refers to the overall time provided by a parent to her\his children and not to the time received by each child.
Notwithstanding these limitations, we believe our work has provided new and important evidence on trends in inequality in parental time, showing crucial gender and educational divides, that have been shown to reinforce other trends increasing the intergenerational transmission of advantage.

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FIGURES AND TABLES

Figure 1. Gini coefficient for all parents with a child aged< 5

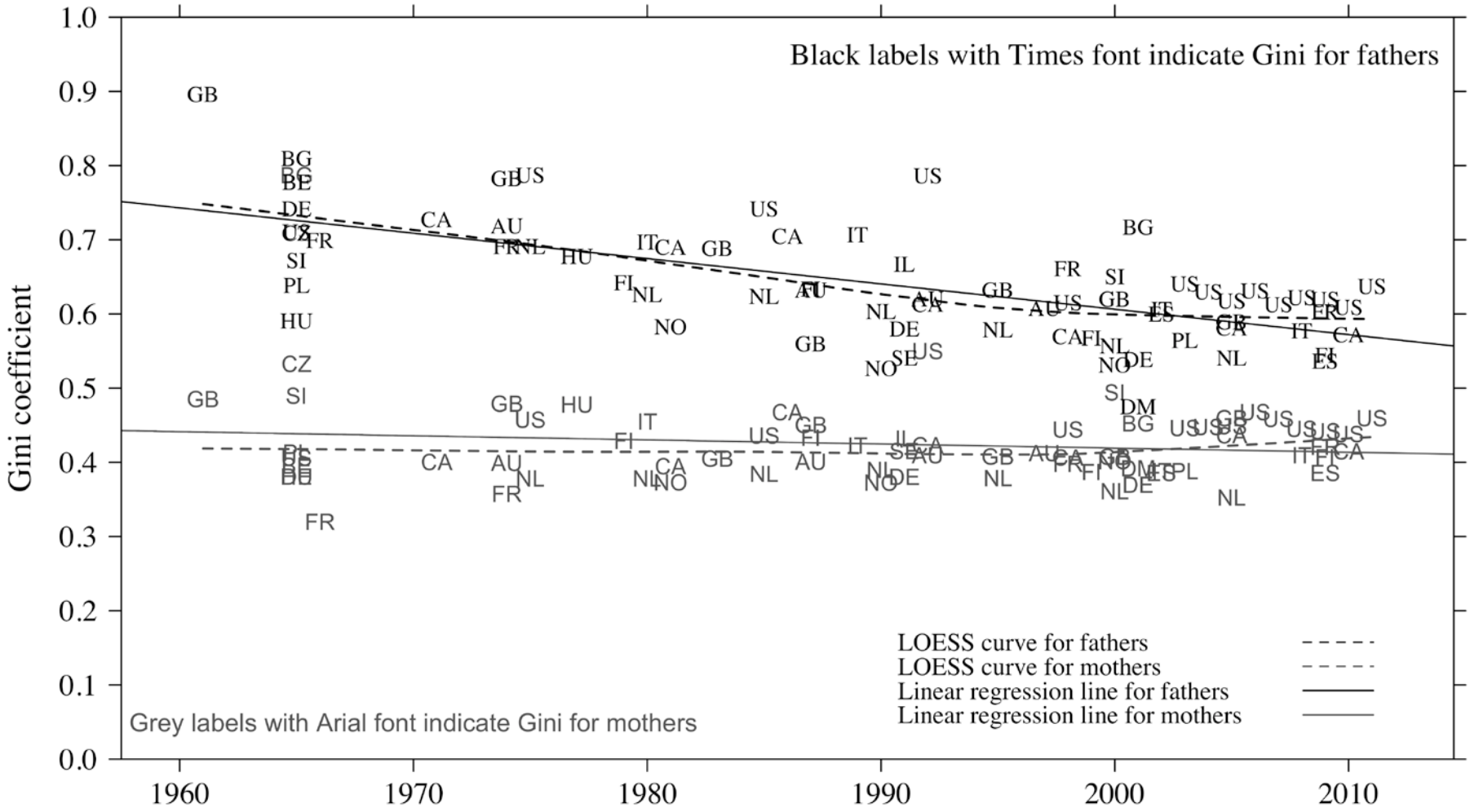

Figure 2. The distribution of childcare time by period

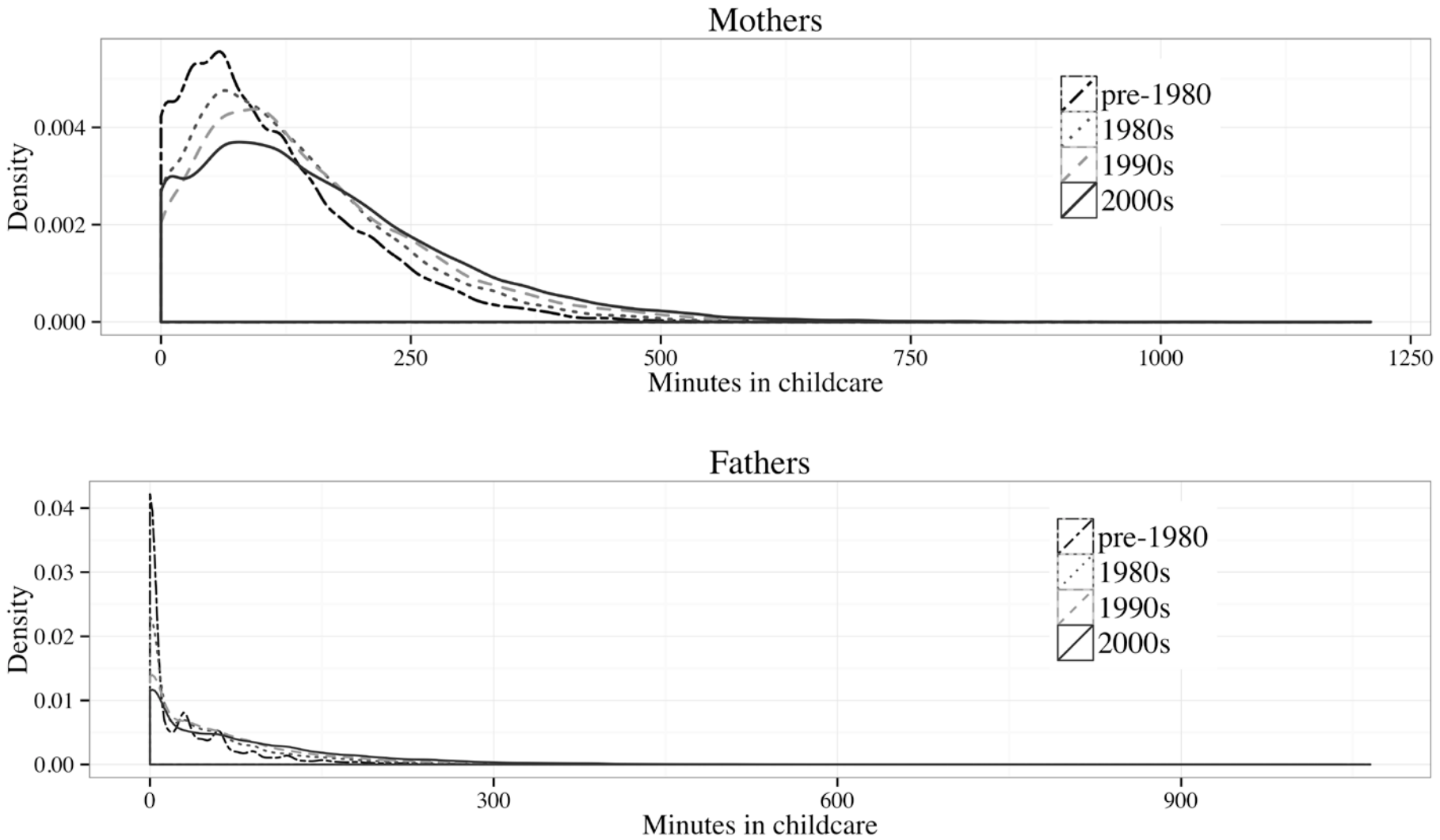

Figure 3. Non-participants (0 reporters) and Gini

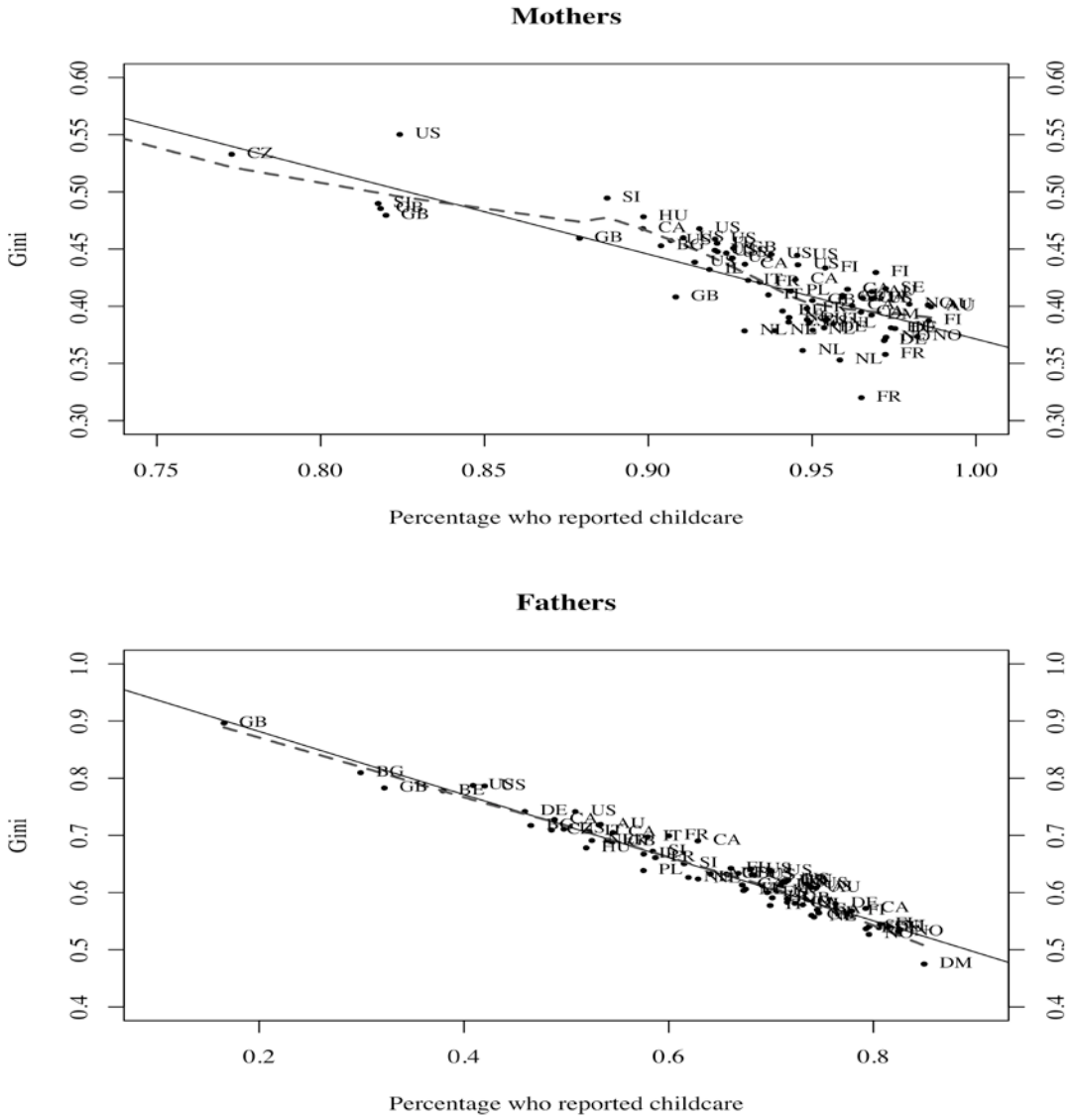

Figure 4. Gini coefficient for all parents with a child aged< 5, by education

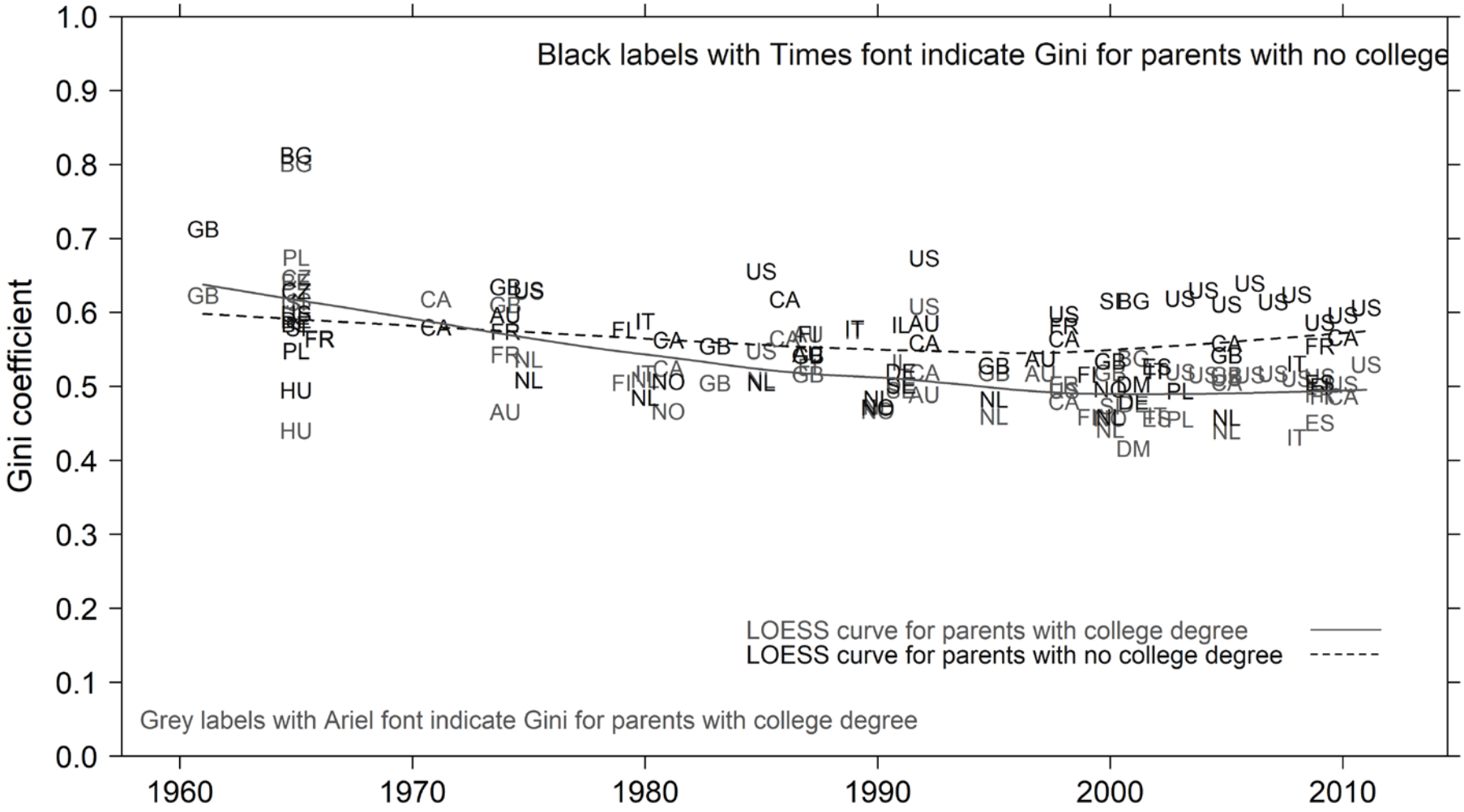

Figure 5. Gini coefficient for mothers with a child aged< 5, by education

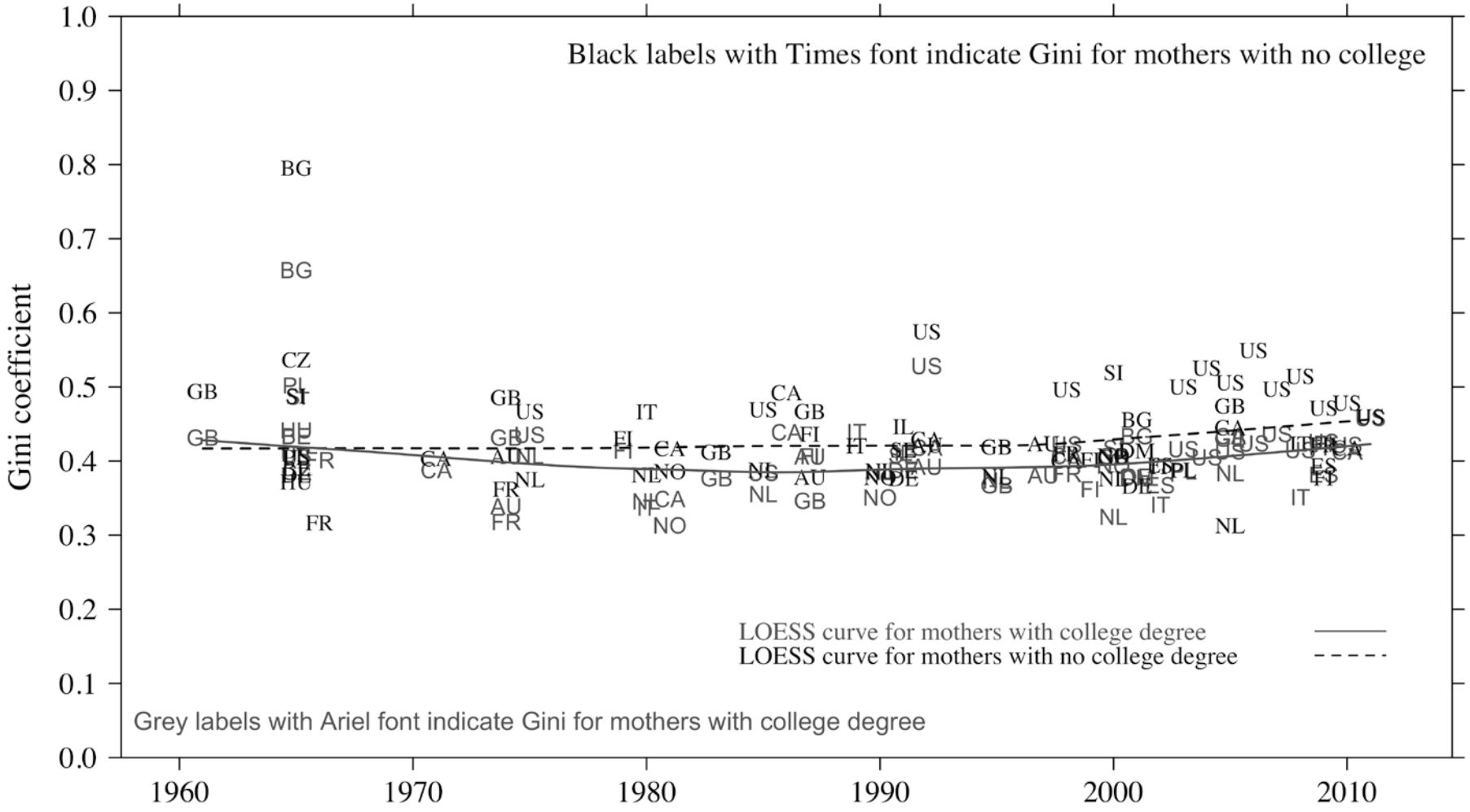

Figure 6. Gini coefficient for fathers with a child aged< 5, by education

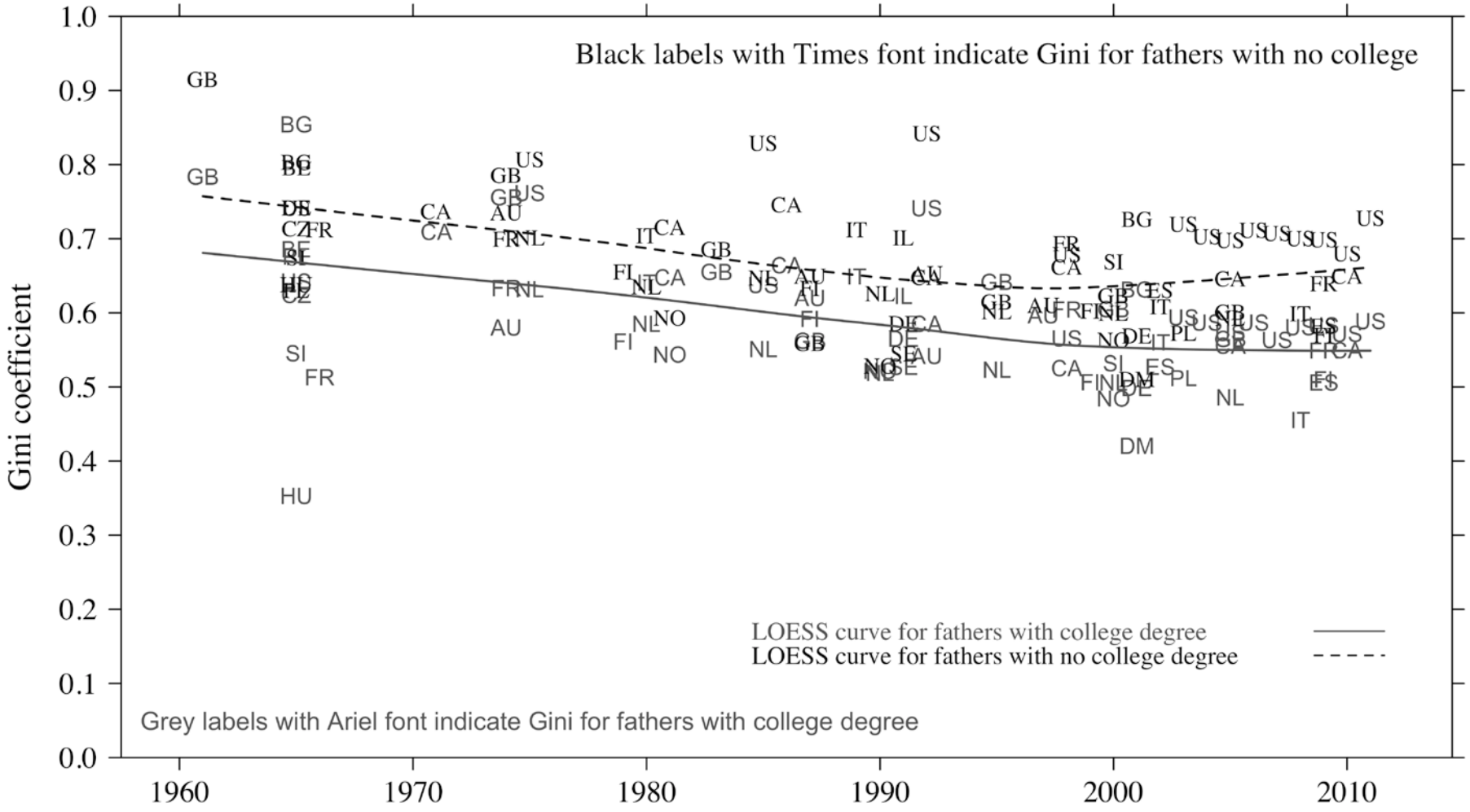

Table 1 Cross-national trends in childcare and inequality in childcare (IGNORE THE STANDARD DEVIATION COLUMN)

		1960-1969				1970-1979				1980-1989				1990-1999				2000-2005				2006-2011			
	Parent	Mean	Median	Std. dev.	Gini	Mean	Median	Std. dev.	Gini	Mean	Median	Std. dev.	Gini	Mean	Median	Std. dev.	Gini	Mean	Median	Std. dev.	Gini	Mean	Median	Std. dev.	Gini
AU	Fathers					26	10	46	0.72	48	25	58	0.63	64	35	81	0.62								
	Mothers					125	100	94	0.40	181	155	132	0.40	187	155	142	0.41								
BG	Fathers	19	0	39	0.81													37	0	61	0.72				
	Mothers	44	0	74	0.79													146	120	122	0.45				
CA	Fathers					32	0	51	0.73	55	20	80	0.70	79	55	90	0.59	88	60	105	0.58	106	70	131	0.57
	Mothers					135	120	98	0.40	141	105	122	0.45	171	145	131	0.42	187	150	151	0.44	200	165	156	0.41
FI	Fathers					45	20	61	0.64	52	30	69	0.63	74	50	84	0.57					100	70	114	0.54
	Mothers					142	120	113	0.43	160	130	128	0.43	182	150	126	0.39					218	180	156	0.41
FR	Fathers	33	15	47	0.70	30	15	45	0.69					45	30	62	0.66					61	40	81	0.60
	Mothers	174	165	98	0.32	150	138	97	0.36					137	120	102	0.40					140	110	111	0.42
DE	Fathers	31	10	48	0.74									57	35	67	0.58	70	50	74	0.54				
	Mothers	146	125	98	0.38									150	130	105	0.38	165	140	110	0.37				
HU	Fathers	49	30	56	0.59	37	10	54	0.68																
	Mothers	123	90	85	0.38	102	80	94	0.48																
IT	Fathers									39	15	64	0.71					55	40	76	0.61	64	50	81	0.58
	Mothers									118	95	92	0.43					136	110	99	0.39	156	130	119	0.41
NL	Fathers					33	15	50	0.69	44	30	57	0.63	58	45	70	0.59	75	45	82	0.55				
	Mothers					100	90	69	0.38	129	120	90	0.38	130	105	93	0.39	148	135	95	0.36				
NO	Fathers									60	45	71	0.58	74	60	73	0.53	74	50	80	0.53				
	Mothers									143	120	98	0.37	157	135	107	0.37	158	130	119	0.40				
PL	Fathers	40	20	52	0.64													81	60	93	0.56				
	Mothers	132	100	95	0.41													199	170	139	0.39				
ES	Fathers																	71	50	86	0.60	96	70	101	0.54
	Mothers																	170	150	121	0.39	176	160	125	0.39
UK	Fathers	11	0	33	0.90	18	0	35	0.78	45	15	60	0.65	83	53	111	0.63	73	50	95	0.62				
	Mothers	88	60	79	0.49	77	60	70	0.48	142	120	107	0.42	165	150	131	0.41	163	130	131	0.42				
US	Fathers	25	0	46	0.71	27	0	61	0.79	30	3	54	0.74	52	10	89	0.73	78	48	112	0.63	83	50	113	0.62
	Mothers	129	108	98	0.41	104	79	92	0.46	146	123	117	0.44	114	80	119	0.53	166	130	138	0.45	164	130	135	0.45
SI	Fathers	45	15	64	0.67													57	30	78	0.65				
	Mothers	91	70	85	0.49													145	100	140	0.49				

Notes: Table 1 reports, for each country in our sample for which we have more than one data point, mean, median, and the Gini coefficient computed on the distribution of childcare time, by decade. We distinguish between mothers and fathers.

Table 2. Correlation between Gini for mothers/fathers and other variables

	Pearson's correlation	*P*	Partial correlation	*P*	N
Mothers					
Gini, disposable income	0.41	0.00	0.40	0.00	56
GDP per capita	0.15	0.24	0.11	0.41	61
Mortality rate, children under 5	0.02	0.87	0.18	0.14	67
Public expenditure	-0.36	0.01	-0.36	0.01	55
Poverty ratio	0.67	0.00	0.69	0.00	35
Pre-primary enrolment	-0.31	0.03	-0.35	0.02	47
Fathers					
Gini, disposable income	0.25	0.06	0.66	0.00	56
GDP per capita	-0.49	0.00	0.05	0.69	61
Mortality rate, children under 5	0.47	0.00	-0.05	0.66	67
Public expenditure	-0.45	0.00	-0.56	0.00	55
Poverty ratio	0.47	0.00	0.76	0.00	35
Pre-primary enrolment	-0.08	0.57	-0.03	0.85	47
Mothers' Gini	0.41	0.00	0.55	0.00	70

Notes: Partial correlations account for the survey year.

Sources: World Bank, UNESCO, LIS & OECD.