Children's time use and family structure in Italy†

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Abstract

A vast sociological and psychological literature has showed that children from intact and non intact families have different cognitive and behavioural outcomes. This may be due to money and time parental differential investments on children, which might also result in different amount of time children themselves spend for human accumulation activities. In this paper we investigate whether living with a single parent affects the time devoted by children in more formative activities, such as reading and studying at home, with respect to children living with both parents. We use data from the Italian Time Use Survey for the year 2008 that contains a detailed time diary for all family members above the age of three. We concentrate our analysis on children between 5 and 18 year old and we find that, even after controlling for the endogeneity of family structure, living in a single parent household reduces the time children devote to readying and studying. This effect turns out to be driven by poor and low educated single parents, most of them being single mothers. In addition, the negative effect of having a single parent is higher for male children and for children without siblings.

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1. Introduction

The Italian family is changing rapidly. In less than twenty years, starting from 1995, the absolute numbers of divorces increased by 90 percent. Though its diffusion is still far from the divorce rates observed in many other countries, most notable the Nordic and Anglo-Saxon countries, the trend in Italy is clearly on the increase. While in 1995 a hypothetical cohort of 1,000 marriages experienced on average 80 divorces, this value rose to 182 in 2011. Likewise, the number of separations also increased, reaching 307 (ISTAT, 2012). Importantly, almost 70% of separations involve couples with children, which naturally raises concern about children's well being and their outcomes. In this regards, it is important to consider that the diffusion of separation usually follows the well-known "S" shape (Goode 1962). This means that the speed of diffusion appears slow at first, then increases rapidly, for slowing down again when approaching its maximum. This trend suggests that the new behaviour emerged first in certain population strata, and later - more broadly - in others (when considered suitable). It is indeed true that in Italy separations have been so far much more common among more educated people and the "pioneers" of marital disruption were couples with higher educated working women, possibly better able to cope with legal and socio-economic cost of separation (Salvini and Vignoli, 2011). However, this is changing, and recently divorce also appears to spread to the lower strata of Italian society (Salvini and Vignoli, 2011; Harkonen and Dronkers 2006). In terms of children's outcomes, it has been argued that until now any detrimental effect might have been modest, since divorce in any case happened more often to those parents with high human capital and reasonably strong safety net provided through sound family resources. However, the diffusion of divorce among less educated and lower income couples will most likely increase the vulnerability of single parents, and, as consequence, the precariousness of their children.

The consequences for children's wellbeing following parental separation depend on background characteristics of the parents, but also on the welfare state support in place to alleviate possible socio-economic difficulties of the post-divorce experience for families with children (for which the vast majority concerns single-mothers). These consequences in the Italian "light-familistic" welfare state (Aassve et al., 2007; Aassve et al., 2009) are potentially more severe compared to other EU countries. Certainly, compared to many other countries, Italy does not have the same institutional framework to cope with a high prevalence of single parenthood.

A vast sociological and psychological literature has showed that children from intact and non intact families have different cognitive and behavioural outcomes. Children of divorced parents, and of single-mothers in particular, have worse outcomes in school (i.e. higher drop-out rates and lower cognitive test scores), in the labour market (i.e. lower future earnings and employment status, and

stronger welfare dependency), and in behaviour (i.e. higher frequency of teenage pregnancy and couple instability). The negative outcomes may be due to the different parental investment both in term of resources and the time spent by parents with their children. However, more recent data, using appropriate econometric techniques accounting for potential endogeneity bias, show that the effect on children's outcome from adverse family structures is small or negligible (Aughinbaugh, 2005; Hofferth, 2006; Bjorklund and Sundstrom, 2006; Sanz-de-Galdeano and Vuri, 2007; Finlay and Neumark, 2008; Francesconi et al., 2010; Corack, 2011, Pronzato and Aassve, 2014)

Our study build on these more recent findings, and look at the time children themselves devote to human capital accumulating activities, such as reading and studying. These activities are closely connected to later outcomes for the children – be it their wages, occupational status or welfare dependency. The central hypothesis is that children of single parents may spend less time on these activities, and hence growing up in a single parent family is detrimental for their long term outcomes. This issue is potentially more important in the Italian setting, not only because of the rather modest state support provided to disrupted families, but also because of the peculiarities of the Italian school system. In particular, the Italian system is one in which children spend relatively few hours at school, whereas there is a heavy emphasis on home-work, a model which derives from the idea that typically one parent tends to stay at home. In so far cognitive outcomes derives from the accumulation of human capital formed at home, through interaction and time spent with the parents, children of single parents may suffer more severely in the Italian setting than what would be the case in other societies. In other words, Italian single parents have fewer opportunities to make time investment with their children, which may exacerbate the detrimental effect for their children.

In the approach taken here we investigate whether living with both parents as opposed to living with a single parent affects the time devoted to children in formative activities such as reading and studying. Our analysis considers both children living with a single mother or a single-father, even if this last category represents only 1% (59 observations) of the sample. Importantly, we take account of the potential selection of family structure with respect to children's human capital accumulation. The selection derives from the idea that human capital accumulation activities may in any case be lower in families where conflict is high or filled with tension – and because of these tensions, parents may pay less attention to the extent in which their children spend time on homework and studying. Importantly, these families are also exposed to higher probability of disruption. In other words, it may not be family disruption or single parenthood *per s*e that leads to less human capital accumulation for the children. We correct for selection by using the approach suggested by Maddala (1983).

The paper is organized as follows: Section 1 contains a review of the relevant literature; in Section 2 we present the empirical methodology used, while in Section 3 we describe the data used for our analysis; the sample selection and the definitions of the variables are presented in Section 4. Section 5 reports and discusses the results of our estimates. Conclusions follow.

2. Background

There is now a large body of literature on the consequences of divorce and separation for adults and children, and the key aspect concerns the extent in which family disruption leads to lower well-being – broadly defined (see Bernardi et al. 2013 for a state of the art review). This rather extensive line of research has emphasized several mechanisms that might explain the observed negative association between parental breakup and children's educational attainment: union disruption might lead to a reduction in economic resources; there can be changes in parental time and in parenting practices; union dissolution might increase parental stress; children might be affected emotionally by their parents separation (Bernardi and Radl 2014).

The earlier literature consistently showed that children of divorced parents are worse on different measures of well-being compared to children living in intact families (Amato 2001; Amato and Keith 1991). Hughes Miller, Finn-Aage and Freng (1999), who studied almost 6,000 students in the 8th grade in the US, find that children of divorced parents are more likely to engage in deviant behaviour, and they argue that parental involvement, reflected through supervision and socialization of good attitudes, is directly linked to family structure. Amato and Sobolewski (2001) using fixed effect estimation, and considering a panel over 17 years, finds that children that experience parental divorce tend to report a comparatively lower level of psychological well-being in adulthood. Ermisch and Francesconi (2001) using information from the British Household Panel Survey, finds that those having spent time with a single mother during childhood have lower probability of achieving A levels or more, have a higher likelihood experiencing economic inactivity, women are more likely to experience early childbirth (meaning before the age of 21), and increased probability of experiencing stress, and finally they are found to have a higher likelihood of being smoker. Robins et al. (2001) using the British NCDS data, consider long-run effects in terms of labour market outcomes at age 33 and again find that individuals who grew up in disrupted households have lower levels of education, higher probability of being out of the labour forces and lower wages and where the effects are stronger for women. They point out, however, that the effects are weaker once controlling for family characteristics pre-disruption, though they remain significant. Biblarz and Gottainer (2000), using

pooled data from the American General Social Surveys for the period 1972 to 1996, found that children raised in single-mother families have significantly lower levels of education, lower occupational status, and also lower reported happiness in adulthood.

A key issue in this literature (which has received considerable attention in the more recent time) concerns self-selection into divorce (Kim 2011). This is an important issue, because those factors leading to divorce, may in any case also lead to other behaviours that affects children's outcomes. In other words, it is not necessarily the case that separation or growing up with a single parent *per se* drives worsened child outcomes, or at least, its detrimental effects might be much lower once such selection is taken into account. This line of analysis is now growing. Francesconi at al. (2005) using the German Socio Economic Panel (GSOEP) analysed as outcomes grades at high school and test scores, as a function of parental separation. Using several approaches which includes sibling fixed effects models, Instrumental variables, and Maski bounds in estimating treatment effects, they first find that family structure matters more than family background when selection is not controlled for. Once it is, the effects are considerably smaller. As they are also able to control for the time exposure to living in single parent households (following the breakup), they advocate that children indeed tend to adjust to the divorce events, suggesting that short and long term effects may be very different. In a similar vein, Sanz-de-Galdeano and Vuri (2007), using instead the National Education Longitudinal Study, and a Difference-in-Difference approach, also find that in terms of cognitive tests scores, there is very little effect of the parental separation *per se*. Essentially, students that experienced a parental divorce were in any case performing worse prior to the divorce event, and as a result parental divorce associates only with a very modest (and in some cases not significant) decrease in test scores, though they also conclude that the effect is stronger when parental break-up happens when the child is younger. Corak (2001) also taking a Difference-in-Difference approach, but using Canadian register data, finds that on average parental loss lead to poorer outcomes, but this effect is overestimated. With the diff-in-diff method estimates become small and often not significant. Men from divorced households earn 3% less than men from intact household, whereas there is no difference for women. But men from divorced family background are more likely to rely on income assistance. Consistent with these findings, Bjorklund and Sundstrom (2006), using data on around 100,000 Swedish siblings, consider educational attainment, and find that little or no effect of divorce. Also using Swedish data, Jonsson and Gahler (1997), focusing on early school leaving and the transition to upper secondary school, and considering access to socio-economic status prior to divorce, find that though children of divorced households have lower educational attainment at age 16, the effects are not particularly strong. A final contribution to this literature is the study of Pronzato and Aassve (2013), who instead of cognitive outcomes focus on children behavioural

problems following divorce. They use the Millennium Cohort Study, and thereby follow children over time, find that there is a modest effect on children's behaviour – though the effect is considerable smaller compared to the more naïve cross-sectional analysis, which does not capture potential selection effects.

As is clear from the previous paragraphs, selection appears to matter considerably in the analysis of partnership break-up and children's later outcomes. Since many of these outcomes concerns educational ones, attention has also been put on the organization of the school system, which in turn will interact with the parental role outside school. Evidence from PISA data shows that family structure matters for children's academic performance across almost all countries, which is consistent with several other studies. As Bernardi et al. (2013) reassess, parental divorce relates to grade retention, the kind of track entered in high school, cognitive development, and educational attainment overall. Also the research from the UK and the US suggests that children who grow up without one or both parents in the household are at risk for a host of negative educational outcomes (McLanahan and Sandefur 1994; Magnuson and Berger 2009; Schiller et al. 2002). However, once family and socio-.economic background is controlled for, the effect of single parenthood is weakened, but remains significant for some countries, including Italy (Scott 2013). Nevertheless, among European countries, the performance of children living with one parent was similar to those living with two parents on tests of reading and literacy in Romania, Russia, and Hungary, after accounting for all available background characteristics. This same pattern was found in Italy and the Netherlands. Related research on families in Italy and other Southern European countries reinforces these results and suggests that the influence of strong family ties can compensate for the lack or loss of one parent (Scott 2013). There is strong evidence that children living in two-parent families in middle- and high-income countries are more likely to stay on track in school and demonstrate higher reading literacy than are children living with one or no parents. In these high- and middle-income countries, the additional financial, social, and cultural capital that two parents can provide to their children appears to give them an educational advantage over their peers from single-parent homes and those who do not live with either of their parents. Härkönen and Dronkers (2006) consider the heterogeneity of the consequences of divorce for children's educational attainment by parental education across countries, and hence different school systems. In particular, they consider whether the parental break-up penalty for tertiary education attainment varies by socioeconomic background, and whether it depends on the societal context. In most countries, parental divorce is associated with a lower probability of attaining a university degree. The divorce penalty is larger for children with highly educated parents.

Related to this strand of the literature, are studies that specifically consider the role of parenting (i.e. time spent with children) and parental resources. As stated by Del Boca et al. (2012) there is ample evidence to suggest that parental investments (both in terms of time and income) spent on children have important impacts on child cognitive and non-cognitive outcomes (e.g. Carneiro and Heckman 2003). In terms of marital break-up, the argument is that this may cause a penalty because the parent left with the children, may both have less time available and also less resources. There are indeed several studies that argue that the detrimental effect of divorce for children indeed work through reduced time investment (e.g. Jonsson & Gähler, 1997). European studies which looked at the role of changes in parenting have found somehow contradictory results, where some reporting a partly mediated effect of parenting and contrary behaviour of children on educational attainment (Bosman, 1994), while another paper found parenting and parental resources to not influence the relationship between parental divorce and child outcomes (Dronkers, 1994). Jonsson and Gahler (1997) find that time constraints do not seem to be an important mechanism behind the negative effect of separation, whereas economic deprivation does, though the effect is rather small in magnitude.

Of particular interest for the current analysis, is the paper by Keding and Bianchi (2008) where they exploit US time-use data to understand to what extent marital break-up indeed affect time spent with children. Undeniably single mothers spend less time with children, but not very much and differences disappear when they control for socioeconomic characteristics. To understand why this is so, it is important to keep in mind that independently of marital break-up, data shows that married mothers are both better educated and richer, and they spend more time with children compared to those with lower education and focus more of their child-related time on activities designed to nurture their children's cognitive development (e.g. Gauthier et al. 2004). Importantly, they are also less likely to divorce. Hence, once all these socio-economic background characteristics are controlled for, marital break-up *per se* have almost no impact on time spent with children.

Yet another closely related extension of this literature concerns the way parents spend their time with children. There is a clear positive association between parental time and children outcomes later in life (see for example early work by Leibowitz 1974). Research on this issue has most frequently relied on available data on children's outcomes (such as biometrical and health parameters, school attainment or income later in life) and parents choices, being constrained by lack of information on the children's choices and their own inputs into investment in human capital. As such, it has been criticised for being too focused on the impact of family decisions and circumstances, while not taking into due consideration the impact of ''the choices that children make given the investments in and opportunities available to them'' Haveman and Wolfe (1995, p1836).

General models of parental investment in children stress its impact on the offspring's human capital, material assets and social capital and specifically the role it shapes children's endowments (Leibowitz 1974, Cunha and Heckman 2007). A traditional view of the allocation of time by school children would consider that time outside ''compulsory activities'' such as school attendance and personal tasks (care, sleeping, etc.) could simply be split into time spent usefully – i.e. doing homework and studying – and any remaining time, all assigned to leisure or not directly useful activities. However, human capital includes components other than formal knowledge, namely personal interaction skills and other non-cognitive skills.

Some studies using time-use data, that have the important advantage to record in details the time spent in different activities, show that there are important country differences. The influence of the mother is particularly relevant in Italy and Germany, where it extends to every activity of children. In France, the mother's allocation of time to socializing does not seem to have an impact on the child's allocation of time to that activity. The father's influence on time allocation, on the other hand, is less often significant. In Italy and France, father's allocation of time to reading and studying does not impact that one of the child; in Germany his allocation of time to socializing does not impact that of the child (Cardoso et al. 2008). Concerning study and reading, parental influence on time allocation operates in Italy mostly via the amount of time they devote to that activity, while in France and Germany the relevant factor is whether the mother reads or not. Countries present more divergence, on the other hand, on the influence that parents' may have on youngsters' time devoted to socializing and to reading and studying. Italy stands out as the country where the role of parents is more pronounced. Further studies on these aspects are now emerging. Gimenez-Nadal et al. (2012) using time-use data from the UK and Spain, consider three activities: basic childcare, educational childcare (helping with homework, talking and reading to children) and supervisory childcare. They find that the effect of parental education matters of the time devoted to different types of childcare. Mother's education seems to be more relevant in determining the time devoted to childcare, and the overall time spent with children increases with mothers' educational level. For the UK however, there is no such effect of mothers' education, and they only find an effect for mothers in educational childcare (as their occupation). In Spain differences are significant and more educated parents devote more time to educational childcare. Mothers' education also increases the time fathers' devote to educational childcare. Another study following this line, is the one by Craig and Mullan (2012) who use time-use data from Australia, US, Denmark and France. They operate with a range of different activities, such as physical care, talked-based care, accompany and any other time spent with the child. In their regression analysis they control for fixed country differences, lone parenthood, though they do not explicitly consider the endogenity surrounding single parenthood and education. Their

results show that in the US lone mothers devote less total time to children than partnered mothers. In Australia and France lone mothers devote more time to talk-based care – in US less. In Denmark there is no difference. In general differences are not big and lone mothers tend to spend as much time as partnered mothers. Only in the US is the difference is significant.

While a large literature has focused on the impact of parental investments on child cognitive development, very little is known about the children's own investments. Information on how children use their time separately from parents is probably little informative for babies and toddlers, but it becomes increasingly important in later stages of life, such as adolescence, when children start to take decisions independently. Del Boca et al.(2012) explores and compares the impacts of time investments by parents and children on child cognitive outcomes. By using the Child Development Supplement of the American PSID (Panel Study of Income Dynamics) 1997-2007 they show that own time investments have a significant effect on cognitive outcomes of children aged 11-15, while mothers' time inputs appear less important. For younger children, the impact of mothers' time is greater, as one might expect. Further attention to children's time use has been recently given in Mancini et al. (2011). The first study focuses on the reading activity and spot imitation as a channel of intergenerational transmission of the habit of reading. The second paper specifies a household production function and considers among home inputs the time children spend reading, doing homework and staying with family, without distinguishing between time spent by the children on their own and time spent with an adult actively engaged. Children's cognitive and behavioural productivity is found to be greatest at ages 7-8 and decline thereafter, indicating that family and neighbourhood contributions to child outcomes are weaker during adolescence. Also relevant in this respect is the study by Cardoso at al. (2010) that considers both children and parents' time use patterns for France, Germany and Italy. They consider socializing together with reading and studying as activities related to the acquisition of human capital, as opposed to passive leisure such as TV watching, often portrayed as detrimental and crowding out other useful activities. They found that the association between parents' and children's time use are depends on parental role model, intergenerational transmission of preferences, and network effects.

3. Methodology and empirical specification

In order to model the impact of family structure on the child's investment in human capital accumulating activities we consider the following linear specification:

$$y_i = \alpha\, single\_parent_i + \boldsymbol{x}_i'\boldsymbol{\delta} + \varepsilon_i \qquad (1)$$

where y_i denotes the daily time (in minutes) spent by child *i* in reading, studying or doing homework, $single\_parent_i$ represents an indicator set equal to one in case of a child living with a single parent, $\boldsymbol{x}_i$ is a vector of individual and household characteristics which will be explained in the next section, and ε_i represents the zero mean random shock.

In order to properly identify the impact of the family structure on the outcome of interest we argue that running a simple OLS regression on equation (1) would likely provide biased results. Ultimately being a single parent can also be the result of unobserved individual choices and preferences. In turn, these unobserved factors can be easily correlated with the outcome of interest. The time devoted by the child to formative activities can be affected by unobserved parental attitudes toward human capital investment, which are themselves correlated to family structures (given the strong correlation between human capital endowment and the likelihood of being a single parent). In this latter scenario the OLS would provide upward biased estimates, due to the positive correlation between unobserved factors and both parental structure and outcome of interest. Nevertheless the direction of the bias is not clear a priori. Therefore we control for the potential endogeneity of the indicator for the family structure by adopting the *treatment effect* model as developed in Maddala (1983).

The treatment effects model estimates the effect of an endogenous binary variable (treatment) on a continuous, fully-observed variable, conditional on other independent variables. The main regression function is:

$$y_i = \alpha\, z_i + \boldsymbol{x}_i\boldsymbol{\delta} + \varepsilon_i$$

where z_i is an endogenous indicator set equal to one if the individual receives the treatment. In our case the treatment corresponds to a child living with a single parent as opposed to living in a two-parent family.

The binary treatment z_i is the outcome of an unobserved latent variable, z_i^*, which is assumed to be a linear function of the vector of exogenous covariates, $\boldsymbol{w}_i$ and a random component η_i :

$$z_i^* = \boldsymbol{w}_i\,\boldsymbol{\alpha} + \eta_i$$

whereas the observed decision is:

$$z_i = \begin{cases} 1 & if \quad z_i^* > 0 \\ 0 & otherwise \end{cases}$$

where ε_i and η_i are random components distributed as bivariate normal with mean zero, covariance equal to ρ, and variance equal to σ. In our empirical application we consider the maximum likelihood estimator of the above model and we control for the selection into treatment by including as exogenous restriction a variable unrelated to the dependent variable in the main regression: the parental religious participation[1].

Other papers have dealt with the identification problem by using sibling fixed-effects (Francesconi et al., 2010), difference-in-difference methods (Sanz-de-Galdeano and Vuri, 2007) or 2SLS estimators (Finlay and Neumark, 2008). The structure and the sample dimension of our dataset does not allow us to use sibling fixed-effects or a difference-in-difference model. The only estimator, alternative to the treatment effect model, and suitable for identifying the effects of interest in case of an endogenous binary variable would be the standard 2SLS method. Both estimators are consistent, but the treatment effect estimator improves upon the latter with increased efficiency if the distributional assumptions are met (Greene, 2008; Wooldridge, 2002).

4. Data

In our empirical analysis we use data from the most recent wave (2008-2009) of the Italian Time Use Survey[2] containing a detailed time diary for all family members above the age of three, in addition to an individual and a household questionnaire. The survey covers 18,250 households corresponding to 44,606 individuals. The sample is constructed by ISTAT to be representative of the Italian population. In each municipality covered by the survey, households were divided into three groups and each group was asked to fill in the daily diary on a different day: a weekday, Saturday or Sunday[3]. For our analysis we consider diaries completed both during weekdays and weekend days, and in the estimation we control for the day.

Each family member is asked to fill out a daily time diary, where each activity has to be recorded covering the entire 24 hours. The activities are described in terms of type, duration (10 minutes episodes or multiples), location where the activity has taken place and the people present during the activity. Time diaries are more precise and reliable than retrospective information on time use. The other advantage of the Italian time use is that also young children's time use is recorded.

Activities are recorded by the respondent as main and secondary activities. For our analysis we consider only activities defined by the respondent as primary.

[1] More details on this variable and the criterion justifying this choice in the next section.
[2] Previous time use surveys were run in 1988 and 2002.
[3] As a result we have an oversampling of diaries filled during weekend days.

In addition to the information provided by the diary, the individual and household questionnaires give other information on each family member such as employment, education, immigration status, and household-related characteristics like economic household conditions (home ownership, other properties, etc.), health status, and satisfaction about different aspects of family life among many others.

5. Variable definition and sample selection

To evaluate the potential impact of the family structure on the investment children do in their human capital we select children between 5 and 18 years old[4], *i.e.* on children in primary, middle and secondary education. Our final sample, after excluding all observations with missing information on variables of interest, consists of 5,161 children. The compulsory education age range in Italy is from 6 to 16, but children enter in the first grade of primary school in the year in which they turn 6 and some children enter even earlier, when they are still 5 years old[5]. From the age of 16 they are free to drop out. In the age range we consider, therefore, most of the children in our sample attend school (97%) and are supposed to study at the end of the classes.

We consider as independent variable in our model the time invested by the child in human capital accumulating activities and we define it as the sum of all time spent in reading, studying and doing homework during the representative day. We consider only the time intervals for which the reading and studying activity is declared as main activity by the respondent. We exclude also the time spent by children in reading and studying at school and therefore only homework and other reading or studying activities for leisure are considered. We want in fact to concentrate on those activities that are a choice for the children (and for their parents that may foster children to do them).

As already mentioned, our main objective is to analyse possible differences in the time devoted to study by children living in two-parent or single parent households. Our definition of single parent includes separated and divorced[6]. A small group of reconstructed families (i.e. families with children from previous marriages) are also included in the sample of two-parent households, representing around 2% of the whole sample (102 obs).

The other controls we include in our specification are child's characteristics (gender, age, being only child), household's characteristics (parental education and religious participation, home

[4] Excluding 5 years old children not enrolled in school.
[5] The choice of beginning school at 5 is limited to children that turn 6 before the month of April of the scholastic year. The choice of anticipating is left to parents.
[6] We exclude 120 observations (2% of the sample) representing widows/widowers, however the results are robust also keeping them in the estimation sample.

ownership, other adults beside parents -both natural and step- living in the home, internet at home) and area of residence (divided into five macro-regions: North West, North East, Centre, South, Islands). A dummy is also introduced to control for the diary being filled during a weekday or a weekend day. The descriptive statistics of all these variables are reported in Table 1 for the whole sample and for the sub-sample of children living with two parents or with a single parent.

Table 1: **Descriptive statistics**

	All sample		**Two parent HH (1)**		**Single parent HH (2)**		
Variables	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**t-test (1)-(2)**
Time study-read (min)	74.37	78.54	74.72	78.89	71.48	75.67	3,24
Female	0.48	0.50	0.48	0.50	0.51	0.50	-0,02
Age	11.99	3.77	11.92	3.79	12.62	3.61	-0.07***
Only child	0.18	0.38	0.16	0.37	0.36	0.48	-0.20**
Single parent	0.11	0.31	0.00	0.00	1.00	0.00	
Religious participation[§]	3.07	1.13	3.13	1.11	2.58	1.17	-0.55***
Parental education[#]	10.85	3.36	10.80	3.34	11.26	3.52	-0.46***
Home ownership	0.72	0.45	0.75	0.44	0.54	0.50	0.20***
Other adults in HH	0.03	0.17	0.03	0.16	0.05	0.21	0.02**
Internet in HH	0.68	0.47	0.69	0.46	0.64	0.48	0.04**
North West	0.22	0.41	0.21	0.41	0.28	0.45	0.07***
North East	0.21	0.41	0.21	0.41	0.23	0.42	0.02
Center	0.16	0.37	0.15	0.36	0.20	0.40	0.04***
South	0.29	0.45	0.30	0.46	0.20	0.40	0.10***
Islands	0.12	0.33	0.13	0.33	0.09	0.29	0.04**
Weekday	0.38	0.48	0.38	0.48	0.37	0.48	0.00
	5,161		4,601		560		

Source: Italian Time Use Survey (2008-9).

Parental education in two parents households is defined as the average years of education of the two parents. In single parent families it coincides with the single parent's years of education.

§ Religious participation in two parents households is the maximum value between parents of how frequently each participates to religious worships. The possible categories take value between 1 and 6: never, a few times a year, more than once a month, once a week, every day. In single parent households the value of the variable refers to the religious participation of the lone parent.

Significance level for a one side t-test: **1%, **5%, *10%

The share of children living in single-parent families has been steadily increasing over time, reaching the 11.3 percent of the total households (ISTAT data for 2012), and doubling in the last decade as results of union dissolution. Specifically, this increase in the number of children living with a single-mother, raised concern on the possible consequences on children outcomes if the family structure affects the time children devote to human capital accumulating activities. If we look at descriptive statistics (Table 1), we observe that the average time children invest in reading and studying is slightly higher for children living with two parents compared to children living with a

single parent: 74.7 versus 71.5 minutes, even if this difference is not statistically significant. Also at the extensive margin, on average no difference emerges by household type (Table 2).

Table 2: Children reading and studying activities by family type

	Two parent HH	Single-parent HH
Probability of studying	0.65	0.65
Time studying (unconditional)	74.7	71.5
Time studying (conditional)	114.9	110.0

Source: Italian Time Use Survey (2008-9).

However, the two family types differ significantly with respect to parents' education and wealth (see Table 1). Single parent households are poorer: only 5% own the residence house as opposed to 7.5% of two-parent households. Also education is higher in single parent households. Children are slightly older in single parent households and more likely to be only child. At the same time they are more likely to live with other adult people other than parents.

There are also differences according to the regional distribution, with a lower concentration of single parents in Southern regions and Islands.

In addition, as expected, single parents report less religious participation (our exclusion restriction). Religious participation[7] is a categorical variable taking values from one to six, denoting how often the parent attends religious worships.

This is the reason whereby we use as exclusion restrictions in our treatment effect model parental religious participation. In a traditional country such as Italy, where religious participation is widespread, the strong negative correlation between religious beliefs and non-intact family structures, such as separated or divorced couples, is well know and documented (i.e. Vignoli and Ferro, 2009). Despite religion being strongly negatively correlated to the single parenthood condition, we argue that the former should not affect the time devoted by children in a systematic way. We could in fact expect that, in case any correlation is at work between parental religious participation and time invested by the child in formative activities, it is reasonable to assume this correlation to be random. Therefore parental religious participation should not affect the dependent variable in any systematic way.

[7] In the questionnaire individuals, asked about the frequency in worship, can choose between the following categories: never, a few times a year, more than once a month, once a week, every day.

6. Results

Table 3 reports the estimation results obtained with the treatment effects model, our preferred specification, compared with those obtained with the OLS estimation. We start from the full sample and then we break the sample down according to different family and child characteristics (Tables 5). From Table 3 it is clear how living with having a single parent reduces the time children spend in reading and studying activities, according to the treatment effect estimation (columns 2 and 3): children living with a single parent spend almost half an hour less than their peers living in two-parent families. All the other regressors have the expected sign: female and older children study more, while parental education increases the time children spend in human capital accumulating activities. The exclusion restriction has the expected sign and is strongly significant: parents with strong religious beliefs have a lower probability of being single. Being without siblings and having more educated parents also increases the likelihood of living with a single parent, while living in the South or Islands reduces that.

The p-value testing the hypothesis of independent equations signals that we cannot rule out the endogeneity because it is rejected at standard significance level; therefore the model is correctly specified and it is preferable to the OLS one.

On the other hand in the OLS estimation the coefficient of single parent is higher suggesting an upward bias: as it emerges from the descriptive statistics, children living with a single parent are positively selected, having higher educated parents Higher parental education can easily be correlated to other unobserved factors fostering higher time spent in human capital-related activities by children.

Table 3: Models on Time spent by children in studying/reading. Results for the full sample

	OLS	TREAT	
		Time study-read	Single parent
Single parent	-7.62**	-28.31***	
	(3.37)	(5.64)	
Religious participation			-0.18***
			(0.02)
Female	13.95***	14.17***	0.06
	(2.12)	(2.13)	(0.05)
Age	19.41***	19.84***	0.14**
	(1.97)	(1.98)	(0.05)
Age squared	-0.68***	-0.70***	0.00**
	(0.09)	(0.09)	(0.00)
Only child	-0.04	2.46	0.53
	(2.72)	(2.74)	(0.06)
Parental education	2.37***	2.52***	0.04***
	(0.36)	(0.36)	(0.01)
Home ownership	-1.78	-4.04	-0.53***
	(2.45)	(2.47)	(0.05)
Other adults in the HH	9.88	11.22	0.31**
	(7.60)	(7.63)	(0.12)
Internet at home	0.80	0.22	-0.13**
	(2.43)	(2.43)	(0.06)
North East	-5.79*	-6.04*	-0.08
	(3.23)	(3.23)	(0.07)
Centre	-3.63	-3.78	-0.03
	(3.45)	(3.46)	(0.08)
South	-0.83	-2.05	-0.29***
	(3.01)	(3.00)	(0.07)
Island	-0.77	-1.84	-0.23**
	(3.87)	(3.87)	(0.09)
Weekday	25.20***	25.17***	-0.01
	(2.18)	(2.18)	(0.05)
λ		11.23	
se (λ)		2.32	
ρ		0.15	
p-value (ρ=0)		0.00	
Obs	5,161	5,161	

Source: Italian Time Use Survey (2008-9).

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis

6.1 Heterogeneity

As reported above there is evidence that two-parents and single-parent families differ according to dimensions that are related to children human capital investments. Therefore we might expect that, breaking down the sample by these characteristics, the difference by family type in children's time spent in reading and studying might increase In particular, we explore if the negative effect of living in a single parent family that emerges from the previous results differs by parental education and wealth. In addition, the negative effect of living with a single parent might differ between only child and children with siblings, as well as by child's age, and gender.

Table 4 shows the probability of reading and studying and the time children devote to these activities by different household characteristics and family types. Contrary to what we observed for the full sample (Table 2), where there were no differences between children living in a two-parent family and children living with a single parent, when we break our sample down according to parental education, wealth, number of siblings, child's age and gender some differences emerge. Children with a highly educated[8] single parent on average study even more than children living with two highly educated parents (Panel A, Table 4). The opposite holds true for low educated parents. This applies in terms of both probability and unconditional mean, while for the conditional mean differences seem to be smaller. When we break our sample down by home ownership similar results are found: children living with a single parent read and study less in poorer households, while the opposite is true for richer families (Panel B, Table 4). Being without siblings seems not to be relevant for children in two-parent families, while only children living with single parents on average study and read much less that the others (Panel C, Table 4). At the same time, the results by gender are in line with recent evidence (Autor and Wasserman, 2013) reporting a more detrimental effect of having a single parent on children outcomes for son than for daughter (Panel D, Table 4). Given the strong correlation between test scores and time devoted to human capital-related activities, our evidence points to the same direction.

We also break our sample down by age (Panel E, Table 4). We consider separately children between 5 and 10 years (in primary schools), children of middle school age (11-13) and children of secondary school age (14-18), where homework are more time demanding. Here no difference emerges for children living in two-parent or single parent household in terms of probability of studying and reading, while in terms of minutes devoted to the activity differences are small.

[8] Children are classified as having a high parental education when the average years of education of the parents (of the single parent, in case of single-parent household) are in the top quartile of the sample distribution.

Table 4: Time spent by children in studying/reading by family characteristics and single/two parents family

	Two parent HH		Single-parent HH	
Panel A	**Parental education**		**Parental education**	
	Low	**High**	**Low**	**High**
Probability of studying	0.64	0.71**	0.62	0.84
Time studying (unconditional)	72.4*	86.8	64.65	101.5
Time studying (conditional)	113.4	122.4	107.4	121.2
Panel B	**Home ownership**		**Home ownership**	
	No	**Yes**	**No**	**Yes**
Probability of studying	0.64	0.65	0.62	0.68
Time studying (unconditional)	73.8*	75.0	65.2	76.8
Time studying (conditional)	114.8	115.0	105.6	113.3
Panel C	**Only child**		**Only child**	
	No	**Yes**	**No**	**Yes**
Probability of studying	0.65	0.66**	0.68	0.59
Time studying (unconditional)	74.5	76.08**	75.96	63.37
Time studying (conditional)	115.0	114.5	111.0	1067.8
Panel D	**Gender**		**Gender**	
	Girl	**Boy**	**Girl**	**Boy**
Probability of studying	0.68	0.62	0.70	0.60
Time studying (unconditional)	81.6	68.4	81.2	61.5
Time studying (conditional)	120.3	109.6	116.7	102.0

Panel E	**Age category**			**Age category**		
	5-10	**11-13**	**14-18**	**5-10**	**11-13**	**14-18**
Probability of studying	0.64	0.72	0.60	0.62	0.73	0.59
Time studying (unconditional)	60.5	87.6	81.0	51.6	83.1	74.0
Time studying (conditional)	94.5	121.0	135.7	83.2	113.8	126.4

Source: Italian Time Use Survey (2008-9). Significance level for a one-side t-test between two-parent and single- mother household: ***1%, **5%, *10%.

Given this descriptive evidence, we replicate our model on the sub-samples described above. Results reporting only the main variable of interest are in Table 5.[9] The results found for the full sample seem to be driven by children in low educated and poorer families. By breaking down the sample according to parental education (Panel A, Table 5), in fact, the impact of living with a single parent disappears in highly educated families, whereas it is confirmed and higher than in the full sample for the low educated ones, whose children read and study 31 minutes less than children from two-parent households.

[9] The full version of Table 5 with all regressors reported are Tables A1-A5 in the Appendix.

A similar picture emerges from comparing poorer and richer families (Panel B, Table 5):[10] children with poor single parents invest in human capital accumulating activities almost 40 minutes less than their peers from poor two-parent families, while the effect is much smaller (around 19 minutes) and less significant among richer families.

Children without siblings suffer more from living with a single parent, with a reduction in time invested in reading and studying of more than 44 minutes per day, whereas for children with siblings the reduction is much lower (19 minutes) (Panel C, Table 5). We can then argue that having siblings might work as an incentive rather than as an obstacle for children in investing their time in formative activities. Very interestingly, only male children suffer from living with a single parent: they study and read in fact 32 minutes less that male children living with two parents. On the contrary, the family structure has not effect on girls (Panel D, Table 5). The results by gender confirm the evidence from Autor and Wasserman (2013), whereby sons suffer more in test scores as a result of having a single parent.

Since we are considering quite a broad age bracket, we try to disentangle potential confounding effects due to the heterogeneity in age by separating the sample in three groups: children of primary school age (5-10), children of middle school age (11-13) and children of secondary school age (14-18). The negative effect of living with a single parent increases with children's age, the secondary school aged children suffering the most with a 39 minutes reduction in the time devoted to reading and studying with respect to their peers living with two-parents (Panel E, Table 5). Despite being lower in magnitude these results are all confirmed when we consider the OLS estimation.

[10] Unfortunately the survey does not provide information on household wealth, Therefore we use home ownership as a proxy. However, the results are also robust to using the information on having a second house, as a proxy.

Table 5: Time spent by children in studying/reading. Heterogeneity of results

	OLS			TREAT		
Panel A	**Low education**		**High education**	**Low education**		**High education**
Single parent	1.70		-7.44**	-10.41		-30.53***
	(9.42)		(3.57)	(1327)		(6.47)
Panel B	**No owner**		**Owner**	**No owner**		**Owner**
Single parent	-11.66**		-3.95	-38.90***		-18.78**
	(5.05)		(4.55)	(8.99)		(8.08)
Panel C	**Only child**		**With siblings**	**Onlychild**		**With siblings**
Single parent	-17.07***		-3.36	-44.36***		-19.35***
	(6.00)		(4.09)	(13.47)		(6.59)
Panel D	**Girl**		**Boy**	**Girl**		**Boy**
Single parent	-6.37		-9.26**	-18.01		-32.08***
	(4.80)		(4.71)	(14.18)		(6.59)
Panel E	**5-10 age**	**11-13 age**	**14-18 age**	**5-10 age**	**11-13 age**	**14-18 age**
Single parent	-7.86	-12.28*	-6.25	-28.64***	-35.84***	-38.74***
	(4.90)	(6.29)	(5.75)	(8.64)	(12.89)	(9.35)

6.2 Robustness checks

In this section we provide additional evidence to check for the robustness of our result.

First we estimate a two-part model where the dependent variable is assumed to have a negative binomial distribution and we compare the result with those obtained with our OLS specification. Time-use data, in fact, are typically considered count data and are often characterized by a large share of zeros (in our case the dependent variable has 35% of values equal to zero). In addition, the data generating process is modelled by two mechanisms: the decision whether doing the activity or not (the extensive margin) and the decision about how much invest in the activity (intensive margin). The suitable statistical models, which relax the assumption that the two processes come from the same data generating process, are the hurdle models (Cameron and Trivedi, 2005). The results (available upon request) we obtain using a hurdle model are extremely close to those obtained with the OLS: the effect of having a single parent is a reduction by 8 minutes in time devoted to study, as opposed to a 7.6 minutes using OLS.

Moreover, we also try to disentangle which factors drive our results. There is evidence of a strong correlation between parental and children time-use, (Cardoso et al., 2013).[11] Child investment in studying/reading represents an input in the child skill production function, and the role of parental time investment in children skill formation is well documented in the literature (Cuhna and

[11] This paper analyses the relationship between parents' and children' time use looking at a cross section of three countries (France, Germany, and Italy).

Heckman, 2007). If the negative effect of having a single parent for children investment in formative activities is due to a reduced endowment of parental time, in particular time devoted to human capital accumulating activities, we expect to find (if any) smaller results once we control for the time parents spent with their children. We then replicate the analysis by controlling for parental working time, which is inversely correlated to time invested in studying/reading with children. Ideally we should control for parental time devoted to studying/reading with the child because this is the activity affecting the most child investment in studying/reading. On the other hand, the former would be strongly correlated to both the endogenous variable and the dependent variable. In addition, in families where more children are present, it is not possible to identify in our dataset with whom of the children the parent is spending her/his time. Parental working time is instead also a function of factors exogenous to parental preferences, being the result of market equilibrium.

In Table 6 we report the baseline results for comparison (Column 1), the results excluding single fathers (Column 2), the results excluding single fathers and controlling for parental working time[12] (Column 3), and the results considering as dependent variable only the time invested by the child in studying/reading alone and controlling for parental working time (Column 4). The evidence for Italy reports that it is mother's time use affecting children time use, in particular in studying/reading activities, whereas father's time use (if anything) has a weak negative effect (Cardoso et al., 2013). Therefore we concentrate on single mothers, excluding single fathers from the sample[13] (Columns 2 and 3). Column (2) shows that the results are driven by single mother. When we control for the time worked by parents, the coefficient of the variable *Single parent* is slightly smaller than in the baseline estimate, and the effect of working time is, as expected negative (Column 3).

We finally consider a more restrictive specification in order to isolate the effect on children own investment, and we consider only the time the child devotes to studying and reading when he/she is alone (Column 4). The negative effect of having a single mother is strongly reduced. These results, taken together, seem to confirm that for children the negative effect on time investment in skill formation due to having a single parent is driven by the lower investment received from parents in human capital enhancing activities.

[12] Parental working time is define as total minutes spent working by the single parent or is the sum of time spent at work by the father and the mother in two-parents households.
[13] Single father represent 2 percent of the sample.

Table 6: Robustness checks of treatment effect model on time spent by children in studying/reading

	(1)	(2)	(3)	(4)
	Baseline	**Only single mothers**	**Only single mothers and parents' work time**	**Only study-read time alone**
Single parent	-28.31***	-27.96***	-24.81***	-9.82**
	(5.64)	(5.93)	(7.60)	(5.01)
Hours worked			-0.07*	-0.06*
			(0.05)	(0.04)
Obs.	5,161		5,161	5,118

Note: Each entry represents an estimate from the treatment regression model (only main equation).

Conclusions

In this paper we have made a first step to better understand the consequences for Italian children from living with a single parent in terms of their accumulation of human capital, here expressed through their reading and studying activities. As we have argued, this is of critical importance, not least because the prevalence of single parenthood is increasingly so rapidly. Our study is also relevant for other Mediterranean countries, such as Spain, where also divorce rates have accelerated in very recent times, but which shares in many respects the Italian welfare model of weak support for single parents. The other key feature of Italy is its school system, in which relies heavily on parental involvement and time investment. In this setting, children of single parents are particularly exposed.

Our results give some support to this idea. Previous studies have documented that the effect of family constellation is considerably weakened, or even disappears, once endogeneity and selection is accounted for. The latter is especially the case for cognitive outcomes, implying that once family conditions are properly controlled for, growing up in a single parent family does not necessarily have any detrimental impact. Following up on this line of analysis, we control for selection effects with the help of the treatment effect modelled proposed by Maddala (1983). Differently from this recent literature, we still find a negative effect for the Italian setting once selection is controlled for. This result is consistent with the idea that Italian children spend less time at school compared to most other school systems in OECD countries, therefore putting children at further disadvantage since single parents (most of the single mothers) are less likely to spend time with their children.

Out findings have important policy implications and, in terms of policy advice, one possible strategy would be to give priority, or subsidize after school, activities to those children having only one parent at home. This policy perspective seems particularly pressing for Italy since divorce and separations are increasing so sharply, and there is clear indication that is the phenomenon is

spreading to the lower strata – including individuals who will have less economic strength to compensate for the loss of time investment. Our finding is also important when doing international comparisons. The impact of parental time investment will necessarily depend to the characteristics of the school system of the country or the region in which the children reside.

Our study does not come without caveats. Whereas time use data offers a huge advantage in one respect – namely providing very precise measure of the time children and parents actually spend in specific activities, it is thin on other aspects which may play a role for the relationship between family status and children's time-use. For instance, for the single parents, we do not know at which time they separated, and it is certainly possible that any negative effects for children's outcome depend on the age when their parents did separate (e.g. Sigle-Rushton et al. 2014). Moreover, we do not know for how long the single parent indeed has remained single. It is also possible that the absent father does spend periods with the children that are not recorded by the time use data, if this happens at intervals outside the time span covered by the survey. The time-use data is also cross-sectional, which rules out other techniques used to control for selection – the obvious one being fixed effect estimation. Whereas we have used the approach by Madalla (1983), as well as provided extensive robustness checks, we cannot be sure to have controlled for all possible sources of selection. And finally, a key argument rests on the fact that on average, Italian children spend less time at school compared to children in other countries. But also in Italy there is heterogeneity, and from our survey we have no information about the school typology.

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Appendix

Table A1: Time spent by children in studying/reading. Heterogeneity of results by parental education

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	Low edu	High edu	High education		Low education	
Single parent	-7.44**	1.70	-30.53***		-10.41	
	(3.57)	(9.42)	(6.47)		(1327)	
Religious participation				-0.17***		-0.24***
				(0.03)		(0.06)
Female	13.76**	14.81**	13.89***	0.03	15.22***	0.23*
	(2.26)	(5.85)	(2.27)	(0.05)	(5.84)	(0.13)
Age	17.91***	23.67***	18.33***	0.12**	24.00***	0.22*
	(2.12)	(5.04)	(2.14)	(0.05)	(5.00)	(0.13)
Age squared	-0.66**	-0.70***	-0.67***	-0.00*	-0.71***	0.01
	(0.09)	(0.22)	(0.09)	(0.00)	(0.22)	(0.01)
Only child	0.50	-0.12	3.49	0.57***	0.80	0.37**
	(2.91)	(7.66)	(2.97)	(0.06)	(7.57)	(0.15)
Home ownership	-0.64	-1.39	3.20	-0.53***	-1.81	-0.18
	(2.52)	(8.65)	(2.55)	(0.06)	(8.61)	(0.17)
Other adults in the HH	9.56	18.39	10.84	0.25*	19.41	0.64
	(7.76)	(35.18)	(7.81)	(0.13)	(34.06)	(0.65)
Internet at home	6.16**	-14.46	5.86**	-0.05	-14.61	-0.08
	(2.40)	(9.76)	(2.41)	(0.06)	(9.69)	(0.19)
North East	-4.23	-12.25	-4.27	-0.01	-13.04	-0.41**
	(3.46)	(8.59)	(3.46)	(0.08)	(8.49)	(0.18)
Centre	-2.33	-11.82	-2.22	0.03	-12.54	-0.30
	(3.68)	(9.20)	(0.19)	(0.08)	(9.12)	(0.19)
South	1.95	-17.51**	0.51	-0.31***	-18.06**	-0.18
	(3.21)	(8.19)	(3.21)	(0.08)	(8.10)	(0.17)
Island	3.08	-22.35**	2.03	-0.19*	-23.60**	-0.64**
	(4.12)	(11.26)	(4.13)	(0.10)	(11.04)	(0.30)
Weekday	26.51***	18.61***	26.53***	0.01	18.41***	-0.13
	(2.35)	(5.73)	(2.35)	(0.06)	(5.79)	(0.13)
λ			12.51		6.59	
se (λ)			2.61		5.34	
P			0.17		0.08	
p-value (ρ=0)			0.00		0.22	
Obs	4,352	809	4,352		808	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A2: Time spent by children in studying/reading. Heterogeneity of results by home ownership

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	No owner	Owner	No owner		Owner	
Single parent	-11.66**	-3.95	-38.90***		-18.78**	
	(5.05)	(4.55)	(8.99)		(8.08)	
Religious participation				-0.23***		-0.15***
				(0.04)		(0.03)
Female	14.80***	13.62***	15.47***	0.08	13.68***	0.03
	(3.93)	(2.51)	(3.94)	(0.08)	(2.51)	(0.06)
Age	24.34***	17.91***	24.66***	0.08	18.24***	0.18***
	(3.63)	(2.35)	(3.65)	(0.08)	(2.35)	(0.06)
Age square	-0.95***	-0.60***	-0.96***	-0.00	-0.61***	-0.01**
	(0.16)	(0.10)	(0.16)	(0.00)	(0.10)	(0.00)
Only child	4.55	-2.18	10.27*	0.67***	-0.86	0.47***
	(4.99)	(3.23)	-38.90***		(3.22)	(0.07)
Parental education	1.79***	2.60***	1.95***	0.03**	2.72***	0.05***
	(0.67)	(0.43)	(0.67)	(0.01)	(0.42)	(0.01)
Other adults in the HH	13.47	7.47	15.96	0.24	8.32	0.35**
	(10.87)	(9.76)	(10.85)	(0.20)	(9.79)	(0.16)
Internet at HH	0.20	1.49	-0.64	-0.12	1.11	-0.15*
	(4.17)	(2.98)	(4.16)	(0.09)	(2.98)	(0.08)
North East	-10.68	-3.83	-9.86	0.04	-4.19	-0.15
	(6.55)	(3.72)	(6.59)	(0.12)	(3.71)	(0.09)
Center	-1.87	-4.13	-1.91	-0.02	-4.26	-0.03
	(6.22)	(4.12)	(6.29)	(0.13)	(4.11)	(0.09)
South	-1.44	0.08	-3.53	-0.23**	-0.68	-0.33***
	(5.38)	(3.62)	(5.42)	(0.11)	(3.60)	(0.09)
Islands	6.85	-3.84	4.20	-0.35**	-4.35	-0.16
	(7.14)	(4.61)	(7.13)	(0.16)	(4.60)	(0.11)
Weekday	21.23***	26.81***	21.20***	0.01	26.82***	-0.01
	(3.98)	(2.59)	(4.01)	(0.08)	(2.59)	(0.06)
λ			15.84		7.63	
se (λ)			4.28		3.09	
P			0.21		0.10	
p-value (ρ=0)			0.00		0.01	
Obs	3,739	1,422	1,422		3,739	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A3: Time spent by children in studying/reading. Heterogeneity of results by gender

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	Girl	Boy	Girl		Boy	
Single parent	-6.37	-9.26**	-18.01		-32.08***	
	(4.80)	(4.71)	(14.18)		(6.59)	
Religious participation				-0.14***		-0.22***
				(0.03)		(0.03)
Age	21.19***	17.69***	21.49***	0.18**	18.03***	0.10
	(2.89)	(2.69)	(2.88)	(0.07)	(2.71)	(0.07)
Age square	-0.72***	-0.65***	-0.73***	-0.01**	-0.65***	-0.00
	(0.12)	(0.12)	(0.12)	(0.00)	(0.12)	(0.00)
Only child	-0.88	0.44	0.67	0.57***	2.94	0.50***
	(4.03)	(3.71)	(4.31)	(0.08)	(3.71)	(0.08)
Parental education	2.44***	2.32***	2.56***	0.06***	2.43***	0.03**
	(0.54)	(0.48)	(0.54)	(0.01)	(0.48)	(0.01)
Home ownership	-2.05	-1.39	-3.53	-0.61***	-3.49	-0.46***
	(3.67)	(3.28)	(3.92)	(0.08)	(3.28)	(0.08)
Other adults in the HH	3.11	16.66*	3.85	0.30*	18.08*	0.30
	(11.66)	(9.79)	(11.71)	(0.17)	(9.92)	(0.18)
Internet at HH	2.00	-0.27	1.70	-0.12	-0.99	-0.15*
	(3.70)	(3.18)	(3.71)	(0.08)	(3.19)	(0.08)
North East	-9.64**	-2.27	-9.94**	-0.14	-2.25	-0.01
	(4.72)	(4.44)	(4.71)	(0.10)	(4.44)	(0.10)
Center	-6.97	-0.48	-7.17	-0.07	-0.46	0.03
	(5.07)	(4.71)	(5.07)	(0.11)	(4.73)	(0.11)
South	-1.36	-0.94	-2.25	-0.39***	-1.96	-0.21**
	(4.55)	(4.01)	(4.58)	(0.10)	(4.01)	(0.10)
Islands	0.71	-1.91	0.13	-0.19	-3.10	-0.25*
	(6.06)	(5.00)	(6.08)	(0.14)	(4.99)	(0.13)
Weekday	25.86***	24.66***	25.97***	0.07	24.43***	-0.07
	(3.28)	(2.91)	(3.27)	(0.07)	(2.92)	(0.07)
λ			6.35		12.37	
se (λ)			6.81		2.61	
P			0.08		0.17	
p-value (ρ=0)			0.35		0.00	
Obs	2,483	2,678	2,483		2,678	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A4: Time spent by children in studying/reading. Heterogeneity of results by single/not single child

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	Only child	With siblings	Only child		With siblings	
Single parent	-17.07***	-3.36	-44.36***		-19.35***	
	(6.00)	(4.09)	(13.47)		(6.59)	
Religious participation				-0.21***		-0.18***
				(0.05)		(0.03)
Female	12.97***	14.12***	13.41***	0.06	14.22***	0.05
	(4.94)	(2.36)	(4.97)	(0.10)	(2.36)	(0.06)
Age	26.33***	17.78***	27.37***	0.18**	18.06***	0.13**
	(4.38)	(2.21)	(4.43)	(0.09)	(2.21)	(0.06)
Age square	-0.99***	-0.61***	-1.02***	-0.01	-0.62***	-0.00*
	(0.19)	(0.10)	(0.19)	(0.00)	(0.10)	(0.00)
Parental education	2.86***	2.28***	3.28***	0.06***	2.37***	0.04***
	(0.83)	(0.40)	(0.81)	(0.02)	(0.40)	(0.01)
Home ownership	-8.52	-0.31	-14.08**	-0.62***	-1.71	-0.50***
	(5.51)	(2.72)	(6.03)	(0.11)	(2.72)	(0.06)
Other adults in the HH	-5.42	13.31	2.56	0.86***	13.56	0.11
	(13.67)	(8.66)	(14.49)	(0.26)	(8.65)	(0.16)
Internet at HH	0.89	0.46	-1.91	-0.40***	0.31	-0.03
	(5.30)	(2.73)	(5.37)	(0.11)	(2.73)	(0.07)
North East	-11.23*	-4.24	-10.07	0.15	-4.69	-0.17**
	(6.76)	(3.69)	(6.81)	(0.14)	(3.69)	(0.08)
Center	1.53	-5.33	2.56	0.17	-5.65	-0.09
	(7.15)	(3.96)	(7.14)	(0.14)	(3.97)	(0.09)
South	0.05	-0.87	-0.66	0.01	-1.97	-0.38***
	(7.01)	(3.36)	(7.07)	(0.15)	(3.35)	(0.08)
Islands	3.11	-1.39	2.67	0.05	-2.33	-0.30***
	(9.37)	(4.29)	(9.40)	(0.20)	(4.28)	(0.11)
Weekday	22.27***	25.67***	21.35***	-0.15	25.77***	0.04
	(4.99)	(2.42)	(5.01)	(0.10)	(2.42)	(0.06)
λ			16.13		8.32	
se (λ)			6.63		2.59	
P			0.22		0.11	
p-value (ρ=0)			0.02		0.00	
Obs	929	4,232	929		4,232	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A5: Time spent by children in studying/reading. Heterogeneity of results by child age

	OLS			TREAT					
				Time study-read	Single parent	Time study-read	Single parent	Time study-read	Single parent
	5-10 age	11-13 age	14-18 age	5-10 age		11-13 age		14-18 age	
Single parent	-7.86	-12.28*	-6.25	-28.64***		-35.84***		-38.74***	
	(4.90)	(6.29)	(5.75)	(8.64)		(12.89)		(9.35)	
Religious participation					-0.17***		-0.16***		-0.19***
					(0.04)		(0.05)		(0.04)
Female	5.92**	15.29***	21.25***	6.01**	0.02	15.59***	0.08	21.75***	0.08
	(2.80)	(4.39)	(3.90)	(2.81)	(0.09)	(4.39)	(0.10)	(3.92)	(0.08)
Only child	2.68	11.70**	-9.02*	4.96	0.56***	14.22**	0.45***	-4.52	0.56***
	(3.68)	(5.81)	(4.98)	(3.73)	(0.09)	(6.02)	(0.12)	(4.99)	(0.09)
Parental education	-0.05	1.67**	4.90***	0.03	0.03*	1.86***	0.04**	5.25***	0.05***
	(0.46)	(0.73)	(0.67)	(0.46)	(0.01)	(0.72)	(0.02)	(0.67)	(0.01)
Home ownership	-3.85	-6.14	4.37	-5.56*	-0.47***	-8.79	-0.51***	0.04	-0.59***
	(3.29)	(5.57)	(4.43)	(3.30)	(0.09)	(5.59)	(0.11)	(4.48)	(0.08)
Other adults in the HH	17.55**	13.69	6.74	18.83**	0.34	17.92	0.68***	7.63	0.15
	(8.09)	(14.23)	(14.24)	(8.15)	(0.22)	(14.31)	(0.24)	(14.24)	(0.19)
Internet at HH	3.13	0.72	1.15	2.76	-0.10	-0.38	-0.21*	0.17	-0.12
	(3.09)	(5.61)	(4.62)	(3.10)	(0.10)	(5.56)	(0.12)	(4.64)	(0.09)
North East	0.63	-10.43	-10.86	0.37	-0.11	-11.06*	-0.08	-10.98*	-0.06
	(4.07)	(6.37)	(6.63)	(4.07)	(0.12)	(6.40)	(0.14)	(6.66)	(0.11)
Center	-3.64	-5.96	-5.79	-3.20	0.11	-6.98	-0.14	-6.51	-0.10
	(4.28)	(7.24)	(6.71)	(4.33)	(0.13)	(7.28)	(0.16)	(6.74)	(0.12)
South	6.16	-7.13	-6.16	5.79	-0.08	-9.47	-0.52***	-8.76	-0.35***
	(4.00)	(5.96)	(5.78)	(4.00)	(0.12)	(5.92)	(0.15)	(5.78)	(0.11)
Islands	2.46	0.42	-4.72	1.88	-0.15	-0.89	-0.22	-7.15	-0.31**
	(5.15)	(8.47)	(7.03)	(5.15)	(0.17)	(8.48)	(0.19)	(7.03)	(0.14)
Weekday	15.74***	31.72***	31.17***	15.84***	0.03	31.09***	-0.12	31.39***	0.03
	(2.87)	(4.53)	(3.99)	(2.88)	(0.09)	(4.55)	(0.11)	(4.01)	(0.08)
λ				10.79		12.87		18.09	
se (λ)				3.15		5.88		4.04	
P				0.17		0.18		0.21	
p-value (ρ=0)				0.00		0.03		0.00	
Obs	1,974	1,144	2,043	1,974		1,144		2043	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.