



HAL
open science

Parents' Separation: What Is The Effect On Parents' and Children's Time Investments?

Hélène Le Forner

► **To cite this version:**

Hélène Le Forner. Parents' Separation: What Is The Effect On Parents' and Children's Time Investments?. 2020. halshs-02937830

HAL Id: halshs-02937830

<https://shs.hal.science/halshs-02937830>

Preprint submitted on 14 Sep 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Parents' Separation: What Is The Effect On Parents' and Children's Time Investments?

Hélène Le Forner

WP 2020 - Nr 28

Parents' Separation: What Is The Effect On Parents' and Children's Time Investments?

Hélène Le Forner ^{*†}

2020

Abstract

This paper investigates the effect of parental separation on children's allocation of their time and on the time spent with their parents. Based on detailed time-use diaries from the Panel Study of Income Dynamics - Child Development Supplement, I estimate an individual fixed-effects model and find that being in a single-parent family decreases time spent with at least one parent present by 18% of a standard deviation. Time spent with both parents together and alone with the non-custodial parent is greatly affected, but the custodial parent partially compensates for this decrease. The decrease in time spent with at least one parent involved in an activity is, however, not statistically significant. Parents seem to preserve time spent with their children when the child is younger at separation. Children whose parents are more highly educated are also less affected with regard to engaged time if they are in single-mother families. Time spent with a step-parent does not act as a recovery channel ; but time spent with a grandparent increases in single-mother families.

JEL classification: D13, J12, J13

Keywords: Time-Use; Child's Time Investments; Parental Time Investment; Family Structure.

^{*}Aix Marseille Univ, CNRS, EHESS, Centrale Marseille, AMSE, Marseille, France; 5-9 Boulevard Maurice Bourdet, 13205, Marseille Cedex 1. [Email: helene.le-forner@univ-amu.fr](mailto:helene.le-forner@univ-amu.fr). Phone: +33 6 78 46 70 79. ORCID Number: 0000-0003-0261-9889. The project leading to this paper has received funding from Excellence Initiative of Aix-Marseille University - A*MIDEX, a French "Investissements d'Avenir" programme. This work was supported by French National Research Agency Grants (ANR-17-EURE-0020). Part of this work was done at Université Paris I Panthéon-Sorbonne and at Paris School of Economics. I declare no conflict of interest.

[†]I wish to thank Hippolyte d'Albis, Andrew Clark, Hélène Couprie, Markus Jäntti, Arnaud Lefranc, Eva Raiber, Elena Stancanelli, and François-Charles Wolff for their helpful comments. I also thank participants in the Work in Progress seminar and at Labor and Public Economics at Paris School of Economics, the PhD Seminar at Université de Cergy-Pontoise, the Seminar at Aix-Marseille School of Economics and the AME Brown Bag Seminar of the Swedish Institute for Social Research (SOFI) in Stockholm. Part of this paper was drafted while I was visiting SOFI; I am grateful to Markus Jäntti who made this visit possible. My thanks go to all the participants in the 2018 JMA Conference (France), the 2018 EALE Conference, the 2019 SMYE, the 2019 RES Annual Meeting, 2019 LAGV, 2019 AFSE, 2019 EEA and 2020 PAA.

1 Introduction

Most existing studies find a negative effect of parental breakup on children’s outcomes such as labor market outcomes, educational attainment, and child well-being¹. One mechanism underlying this effect is a decrease in time spent with parents (Løken et al. 2018), which may be associated with a change in children’s allocation of their time. Yet, little is known about the effect of parental separation on parental time and children’s allocation of their time. This paper investigates the effect of a change in family structure on children’s allocation of their time and on the time spent with their parents, using an individual fixed-effect model. A burgeoning literature has shown that maternal or parental time is one of the most productive input for both cognitive and socio-emotional skills, especially in early childhood (Aizer 2004; Cunha & Heckman 2008; Cunha et al. 2010; Del Boca et al. 2017; Del Bono et al. 2016; Fiorini & Keane 2014). Children’s time investments also impact their cognitive skills (Del Boca et al. 2017; Funk & Kemper 2016) and their health (Anderson et al. 2017).

Looking at parental time from parents’ time-use diaries, several studies find that single-mothers spend more time with their children, when observed selection is controlled for, but these studies are not able to observe time spent with the non-custodial parent (Kalenkoski et al. 2005, 2007; Kendig & Bianchi 2008; Le Bourdais & Rapoport 2001) or shared parenting time (Carlson & Berger 2013). There is also existing evidence that children’s allocation of time vary across family structures (Kalenkoski et al. 2011). To the best of my knowledge, Kalil et al. (2014) is the closest to mine in terms of time investments definition. They look at time spent with each adult, along with shared parenting time across family structures². There are however many possible unobserved variables which may confound the relationship between parental separation and time investments. There is little research aiming at controlling for omitted variable bias. Exceptions are Grätz (2017), Mencarini et al. (2017), and Bibler (2020). Using family fixed effect model, Grätz (2017) shows that parental separation negatively affects father’s involvement.³ Using a difference-in-differences

¹See Ermisch & Francesconi (2001a,b); Francesconi et al. (2010); Frimmel et al. (2016); Goisis et al. (2019); González & Viitanen (2018); Gruber (2004); Hofferth (2006); Le Forner (2020); Pronzato & Aassve (2019); Ribar et al. (2017). Few papers find no effect of parental separation on child outcomes, including Björklund et al. (2007); Björklund & Sundström (2006); and Ginther & Pollak (2004) when income is controlled for. For recent literature reviews, see Amato (2010) or McLanahan et al. (2013).

²They however define shared parenting time as time spent with all resident adults in the household; while I adopt a different definition. Time spent with parents might have a stronger effect on children’s development than time spent with other adults (Fiorini & Keane 2014), I therefore look at time shared with parents only. I test different possible definitions of parental time in Section 4.3

³Using the German Socio-Economic Panel Study (GSOEP), Grätz (2017) looks at parents’ involvement, which is measured from 16 questions about the parent-child relationship.

specification, [Mencarini et al. \(2017\)](#) focus on children’s allocation of their time and find that being in a single-parent household reduces the amount of time spent reading and studying; this effect is driven by less educated families, only children and boys. Focusing on the gender gap, [Bibler \(2020\)](#) uses a child fixed effect on the Panel Study of Income Dynamics - Child Development Supplement, and finds that boys experience a larger decrease in fathers’ time investments, with little evidence that mothers increase investments in boys relative to girls after a family structure change⁴.

This paper offers three main contributions. First, it provides new evidence on the effect of a change in family structure on a child’s time investments and time spent with parents, controlling for the child’s unobserved characteristics that are constant over time (sex, ethnicity, genetic factors, parental abilities or personality traits). Second, it extends the analysis of time spent with parents to time spent with both parents together, distinguishing parental time from time spent with other adults⁵. Third, it uses parental separation as a framework to study the complementarity between time spent with the two parents: how each parent adapts the time spent with his/her children to the other parent’s supply.

I use the Panel Study of Income Dynamics - Child Development Supplement (PSID-CDS). It provides time-use diaries by 2,900 children first interviewed in 1997 and followed up in 2002 and 2007. It collects data on the children’s activities, their duration, and who was present or involved. Using time-use diaries is a way of avoiding measurement errors due to recall error biases, likely to be large for children. I consider five activities: (house)work, personal needs and care, education, active and passive leisure. Time with at least one parent is divided into time with the mother alone, with the father alone and with both parents together.⁶ Based on this dataset, I am able to distinguish between accessible time (when the parent is around) and engaged time (when the parent is involved in the activity). I can therefore account for the quality of the time spent with the child. I use an individual fixed-effect model to estimate the impact of being in a single-parent family on child and parental time investment.

Four new findings are worthy of note. First, the change in family structure does not have any

⁴In [Bibler \(2020\)](#), paternal/maternal time investment is defined as the sum of the duration of all activities in the time diary for which the father/the mother participated in the activity. In this study, I chose to consider time spent with *at least* one parent, divided into time spent with the mother alone, with the father alone, and with both parents together. Hence, I am able to know if the decrease in time spent with the father translates into a decrease in time spent with at least one parent, or only in a decrease in time spent with both parents together. Consequences for children’s development might not be the same.

⁵This distinction is of importance since [Fiorini & Keane \(2014\)](#) find a different effect of being with the two parents rather than other adults for cognitive skills.

⁶In the main analysis, I consider time spent with biological or adoptive parents. Section 4.3 also considers time spent with at least one adult, including time spent with other adults such as a grandparent or a stepparent.

impact on children’s allocation of their time (whoever is present): children do not change their habits. However, time spent with at least one parent present decreases. Estimations do not suggest that there is a strong effect on time spent on activities with at least one parent involved. Third, the breakdown of accessible and engaged parental time is highly affected. Time spent with both parents together and alone with the non-custodial parent decreases for most activities. The custodial parent compensates partially for the decrease in time spent with the non-custodial parent, and seeks to maintain the amount of quality time. Fourth, children who were younger when the separation occurred seem to be less affected by the decrease in time spent with at least one parent. Results are less clear-cut for children whose primary care-giver is more highly educated. They seem less affected with regard to engaged time if they are in single-mother families but this does not hold for accessible time.

The remainder of the paper proceeds as follows. Mechanisms through which a change in family structure may affect children’s time-use and time spent with parents are presented in the next section. Section 3 provides a description of the data, main variables and some descriptive statistics and presents the identification strategy. Section 4 shows results from estimations of a change in family structure’s impact on time investments. Section 5 discusses the results and concludes.

2 Background: potential mechanisms explaining the impact of a change in family structure on children’s time-use

According to theoretical frameworks ([Becker 1965](#); [Blundell et al. 2005](#); [Chiappori 1988](#)), parents rationally choose the amounts of time they spend on different activities, including child care and the labor market. They also choose the amounts of goods they purchase in such a way as to maximize utility subject to their budget and time constraints. Three potential mechanisms could explain a negative effect of parental breakup on parental time. First, since there is one parent less, a parental separation may decrease the resources available to be invested in household goods, and therefore in the child’s human capital. Parents may have less time available to spend with their child, and less money to spend on costly activities. Second, separation means parents lose all the consumption and production complementarities they had as a couple. Two singles living apart need about 2h15 more spare time a day to achieve the same utility level as when living in a couple ; and a single woman requires on average 55% of a couple’s time resources to live as well as when she was in a couple ([Couprie 2007](#); [Couprie & Ferrant 2015](#)). Thus, the custodial parent may be more time-constrained

and may have less time to look after her child. Third, there could also be complementarities between parents' allocation of time: if one parent increases (decreases) the time spent with the child, the other parent may increase (decrease) it too. In this case, a parental separation might translate into less parental time. Empirical studies find a complementarity in leisure time and suggest that parents have a preference for spending leisure time together with children (Pailhé & Solaz 2004), but women may react less strongly to their spouse's behavior (Van Soest & Stancanelli 2012).

On the other hand, several mechanisms would predict either an increase or a null effect on parental time investments after parental breakup. Collective models (Blundell et al. 2005; Chiappori 1988; Lundberg & Pollak 1996, for a discussion) now account for the relative bargaining power of parents. In this framework, the resources allocated to children, including time resources, are jointly decided by both parents according to their relative bargaining power. If both parents are equally altruistic, their relative bargaining power is not a determinant of the child's well-being. However, if the parents differ in their altruism, the child's well-being is positively related to the bargaining power of the most altruistic parent. Consequently, a child living in a household where the most altruistic parent's bargaining power increases will be allocated greater resources⁷. In a parental separation, it can be assumed that the child will stay with the most altruistic parent whose bargaining power will increase. Moreover, parents may also compensate for a shock on time resources for children. Under increasing mother's labor supply, several studies find little evidence of a negative effect on the child's emotional outcomes, suggesting a compensation effect through an increase in the other parent's time investment or the adoption of alternative child-care arrangements (Hsin & Felfe 2014).⁸ When there is parental separation, the custodial parent may also compensate for the decrease in the non-custodial parent's time investment.

Most existing studies focus on the difference between single-parent families and two-parent families, with little attention paid to the effect of a step-parent. The presence of a step-parent could act as either a shock or a recovery channel (Evenhouse & Reilly 2004; Gennetian 2005). If adults prefer to spend time with their child when there is another adult involved (complementarity effect), because going shopping alone with children might be quite a challenge, the custodial parent might increase the time spent with the child if she has a partner. On the other hand, if the parent's

⁷For instance, Lundberg et al. (1997) found that switching child support benefits from father to mother in the 1970s increased the amount of expenditure on children's clothing. Bruins (2017) find that a five percentage point increase in women's bargaining power, measured as the wage ratio, raises parents' time with children by one hour per week.

⁸Nevertheless, Agostinelli & Sorrenti (2018) find that an increase in the mother's labor supply negatively affects the child's development by around 6% of a standard-deviation, the effect of the decrease in parental time investments overcoming the income effect.

bargaining power decreases when she starts to live with her new partner, and if this partner is less altruistic about her child, the resources available for the child's development might be "taxed" by this new partner (see [Ginther & Pollak 2004](#), for a more detailed discussion). Similarly, a higher non-custodial parent's bargaining power increases the probability that he pays some child support and the amount of child support relative to household income ([Ermisch & Pronzato 2008](#)). Yet other studies argue for a cumulative effect when both fathers contribute resources ([White & Gilbreth 2001](#)).

3 Data and Methods

3.1 Data

The Panel Study of Income Dynamics (PSID) began in 1968 in the United States with a nationally representative sample. Information on these individuals and their descendants has been collected continuously, providing inter-generational data for all these families.

The PSID - Child Development Supplement (PSID-CDS) follows 3,500 children first interviewed in 1997 (Wave 1), then in 2002 (Wave 2) and 2007 (Wave 3). A large number leave the sample in the third wave due to the age limit (they are over 19, see [Fig. 2](#) in the Online Appendix).⁹ The sample is not large, but the survey does collect a rich set of information about children's cognitive skills, socio-emotional skills, demographics and parental background, along with time-use diaries for two days, one during the week and one at the weekend. The child fills in the diary where possible, and the primary care-giver if necessary. Time-use diaries provide information on the activity, where the activity took place, and with whom. The only other panel data using time-use diaries appears to be the Longitudinal Study of Australian Children (LSAC). However, although the LSAC is based on a larger sample and is biannually surveyed, there is no distinction between parent and step-parent in the time-use diary. This makes the PSID-CDS a more appropriate dataset for studying the effect of parental separation on children's time-use and parental time investments.

3.1.1 Sample Selection Criteria

In the PSID - CDS, there are a total of 5,823 observations (2,904 in wave 1, 1,791 in wave 2, 1,128 in wave 3) from children who filled a time-use diary. Among those children, not all returned both weekend and weekday diaries. To avoid classical measurement error, I exclude those cases. Besides,

⁹A more detailed description of attrition is given in [Section 6.2](#) in the Online Appendix.

I restrict the sample to observations with information on relevant variables. This leads to a sample of 5,264 observations (2,488 in wave 1, 1,776 in wave 2, 1,000 in wave 3). I also drop outliers where the child was declared to spend all the day in passive leisure, less than 50 hours at sleeping a week, and children for whom we did not have the information on who was there for more than 130 hours a week¹⁰. This produces a sample of 5,153 observations (2,478 in wave 1, 1,730 in wave 2, 945 in wave 3). Finally, to perform a child fixed-effect analysis, I need enough variation in family structure in the sample, hence all families remaining single-mother families, with a step-parent or not, or single-father families, or others throughout the three waves have been excluded from the sample. This leads to a sample of 4,029 observations (1,830 in wave 1, 1,399 in wave 2, 800 in wave 3). I also restrict the sample to children for whom we have at least two observations ; this produces a sample of 3,687 observations (1,508 in wave 1, 1,386 in wave 2, 793 in wave 3) from 1,522 children, observed at least two times.

Table 1 reports the summary statistics for the sample for whom we have all the relevant information (column 1), for whom we have excluded outliers in terms of allocation of time (column 2) ; for whom we have enough variation in the family structure to be able to perform a child fixed effect analysis (column 3) and, for whom we have at least two observations (column 4). Excluding outliers leads to a similar sample. Excluding families remaining in single-mother families, with a step-parent or not, or single-father families, or others throughout the three waves (whereas families remaining in a two-parents family are still in the sample) leads obviously to a sample with a larger share of two-parents families. White children are also more represented in that sample, indicating a correlation between family structure and ethnicity. The two samples are otherwise similar. Restricting the sample to children observed at least in two waves produces a similar sample.

3.1.2 *Time investment variables*

Children fill in the time-use diary for one day during the week and one day at the weekend, picked randomly at the beginning of the survey; no substitution is possible. They fill in the diary on a 24-hour continuous basis, to avoid measurement errors. The child has to report the activity, the duration, the location, who was present during the activity, and who was involved.¹¹ This can be used to measure time investments in each activity for a representative week (in hours), using a weighted average of time investments during the week and at the weekend.

¹⁰More precisely, I exclude observations for whom more than 130h a week was declared doing an activity for which the child is supposed to do it on his own (such as sleeping or school); denoted as "non relevant" in Panel A of Table 3

¹¹An example of the time-use diary is provided [here](#).

Compared to other measures¹² of time investments, time-use diaries lead to far less frequent recall errors; and socially valuable activities are also less likely to be over-estimated. Because children may be more subject to recall errors, and because time spent with parents is socially valuable and therefore subject to a bias towards over-estimation in stylized measures, the time-use diary appears to be the most appropriate way to measure children's time-use. But this comes at the cost of day-to-day variation bias. Since filling in the time-use diary takes a lot of time (18 minutes according to [Juster et al. \(2003\)](#)), the dataset used here only provides diaries for two days. Except for routine activities, therefore, this time-use information is subject to classical measurement errors.

I use five categories: Work and housework; Personal needs and care including sleeping time; Education including reading time; Active leisure (sports, dance, going to the theatre) and Passive leisure (Watching TV, Arguing). Note that the study focuses on the primary activity. [Table 2](#) shows how children divide their week among these activities. Children spend a small part of their time on housework and work activities. They spend half the day on personal needs and care (including sleeping). The rest of the representative day is devoted to educational activities and active and passive leisure.

For each activity, I distinguish between time spent alone, with the mother only, with the father only and with both parents together. I also look at time spent with at least one parent. A distinction is made between time spent with a parent involved in the activity (engaged time) or simply present during the activity (accessible time) (see [Hofferth & Sandberg 2001](#)). First, a child's overall time investments are considered, regardless of who is with the child. Then I distinguish time spent alone from time with at least one parent, the latter further broken down into three types of parental time: time with the mother only, time with the father only and time with both parents together. Time with other adults, such as step-parents and grandparents, is also measured (see [Table 3](#)). [Table 3](#) shows a breakdown of time according to who is involved in the activity. Panel A of [Table 3](#) gives a breakdown of time for a representative day. "Not relevant" means that children are assumed to do the activity on their own. Since this includes sleeping, it covers half of a representative day. The child may be doing the activity alone, or with at least one adult, or with someone else ("other"): a

¹²There are three main methods of recording information on time-use: stylized measures, time-use diaries, and experiential sampling. In stylized measures, a respondent is asked to state typical amounts of time spent on a particular activity. This measure is subject to recall error biases: activities that are socially valuable are often over-estimated and the total amount of time often exceeds the 24-hour daily basis. Time-use diaries lead to far less frequent recall errors; but this comes at the cost of day-to-day variation bias. Under the experiential sampling method (ESM), respondents report the activity they are actually engaged in whenever an electronic pager randomly activates a signal. However measurement errors, while much smaller, cannot be excluded, especially in social activities where the presence of others might bias the response. Moreover, ESM is very costly and the samples are often fairly small. For a detailed discussion of the pros and cons of all these measures, see [Juster et al. \(2003\)](#).

sibling, a half-sibling, another relative or non-relative. I exclude this latter category from time spent with at least one adult because of lack of information (age, sex, etc.) on these individuals. Panel B of Table 3 reports a breakdown of time spent with at least one adult. This consists mainly of time with at least one parent, with a grandparent alone or other parental time defined as time with one parent and someone else (grandparent or step-parent). Panel C of Table 3 shows a breakdown of time with at least one parent. Half of the parental time investment is time with the mother only, and more than 75% of the time with at least one parent consists of time with at least the mother. In the main analysis, other parental time (time spent with at least one parent and someone else) is not included in parental time due to uncertainties over the effect on a child's well-being of time spent with a step-parent. I test the sensitivity of my results to this restriction in Section 4.3. Time investment variables have been standardized to a mean of zero and a standard deviation of one for the rest of analysis.

3.1.3 Family Structure

Family structure is defined from the following questions: "Does CHILD live with (his/her) biological/adoptive mother?" and "Does CHILD live with (his/her) biological/adoptive father?". I do not distinguish between adoptive or biological parents¹³.

I use five family types: children who are living with both parents¹⁴; with their mother only; with their mother who has a partner either living or not living with the child; with their father only; and with others (children not living either with their mother or with their father). However there are too few observations for these two latter groups to allow conclusions to be drawn. Dummies are also included to control for the death of parents.

Table 4 shows the transition matrices for family structure from Wave 1 to Wave 2, and from Wave 2 to Wave 3. Note that all families remaining single-mother families, with a step-parent or not, or single-father families, or others (on the diagonal) throughout the three waves have been excluded from the analysis (See Section 3.1.1). The rest of the observations are used to identify the effect of a change in family structure.

¹³However I make a distinction between adoptive/biological parents and a step-parent who is a parent's new partner.

¹⁴Several studies have distinguished between cohabiting and married couples (Barg & Beblo 2012; Bianchi et al. 2014; Carlson & Berger 2013). Men's and women's time allocated to nonmarket work is generally more similar among cohabiting couples than among married couples (Bianchi et al. 2014); the same pattern is found for childcare (Barg & Beblo 2012). However, couples generally marry before the birth and we don't expect that parents' gender norms to change over time. Therefore, the individual fixed effect already account for these differences.

3.1.4 Other controls

Controls are included on individual and family characteristics: age, primary care-giver (PCG)'s employment status, education and earnings, and number of siblings. Table 5 shows the summary statistics for these control variables for the whole sample, for each wave. The average age is around 6 years old, 12 years old and 14.5 years old for Waves 1-3, respectively. 74% of our sample is white. The proportion of children living with both parents is around 89% in the first wave, but it is only around 76% in the last wave; hence, the proportion of children living with their single mother increases. It is worthy to note that the sample selection criteria leads to a larger share of two-parents families and of white children¹⁵ (See Section 3.1.1).

3.2 Estimation Strategy

I estimate the effect of a change in family structure on child and parental time investment using an individual fixed-effect analysis at the child level. A common identification problem comes from the correlation between family structure and unobserved variables that may affect child and parental time investment. When dealing with separation, selection has long been recognized as an estimation issue by economists (see McLanahan et al. 2013, for a literature review). A child fixed-effect model copes with selection due to time-invariant variables, observed or not.

Let TI_{it}^k be a vector of time inputs measured by the total amount of time spent on activity k at time t (no matter who was there); and PTI_{it}^{kP} a vector of parent P's time inputs spent on activity k . These two variables are standardized for a mean of zero and a standard deviation of one. FS_{it}^k is a set of dummies indicating family structure at time t . The two-parent families are the reference category. X_{it} denotes all control variables described above such as child's age, primary care-giver's working status and earnings, and number of siblings. The child fixed-effect is denoted α_i , and absorbs the remaining time invariant controls, such as child's sex, ethnicity, or child's personality traits. The effect of family structure can be estimated following Eq . 1:

$$(P)TI_{it}^k = \delta_1 FS_{it} + \delta_2 X_{it} + \alpha_i + \epsilon_{it} \quad (\text{Eq . 1})$$

where δ_1 measures the effect of a change in family structure on the amount of time spent on the activities.

¹⁵In particular, to perform a child fixed-effect analysis, we need enough variation in family structure in the sample, hence all families remaining single-mother families, with a step-parent or not, or single-father families, or others throughout the three waves have been excluded from the sample ; whereas families remaining in a two-parents family remain in the sample.

The fixed-effect model rules out endogeneity issues due to correlation between family structure and time-invariant variables at the child level such as child's time-invariant characteristics or any variable which effect is constant over time. Nevertheless, the fixed-effect estimator still relies on strong assumptions. **i)** Measurement errors on time investments should not be correlated with family structure. To avoid this, children are asked to fill in the time-use diaries for two randomly selected days in the week and no substitution is possible. This reduces the likelihood of their consistently filling in the time-use diary when they are with the custodial parent. While this practice prevents large measurement errors, the assumption is still very strong. **ii)** The fixed-effect estimator does not deal with unobserved time-varying variables. Examples of such variables are multiple: parents' characteristics such as behavior (alcohol addiction), mental health, or parental conflict. How far this assumption is violated is uncertain. **iii)** Reverse causality might also be a source of endogeneity. The parents may be separating because one of them is not sufficiently present in the home. **iv)** Anticipation effects may also bias the estimates; parents might have changed their time investments prior to the separation (see [Bargain et al. 2012](#); [Genadek et al. 2007](#); [Özcan & Breen 2012](#), for a literature review).

To check if assumptions **iii)** and **iv)** hold, parental time investments before and after the parental separation can be compared. An event study shows whether time spent with parents is affected before the parental separation. Results presented in Fig. 1 in the Online Appendix suggest that assumptions **iii)** and **iv)** hold.¹⁶

If one of these assumptions is not correct, the fixed effect estimator will only indicate suggestive associations between family structure and parental time investments, rather than causal relationships.

¹⁶More precisely, the sample includes those remaining in a two-parent family throughout the survey, and those changing to a single-mother family. Due to insufficient observations, individuals living for a time in a single-father family or in "other" types of families are excluded. We run an event study controlling for an individual fixed effect. Figure 1 in the Online Appendix reports the estimates of the effect of parental separation on time investments before and after the event. The effect of parental separation one period before is set to 0. There is no evidence of an effect of parental separation on time investments two periods previously.

4 Results

4.1 Average effect of a change in family structure on children's and parents' time investments

In Table 6, we examine whether a change in family structure affects child and parental time investments. Standard errors are clustered at the individual level. Models include individual fixed effects and controls such as age, number of siblings, primary care-giver's education, employment status and earnings. Dummies indicating whether the child has a deceased parent are included. Amounts of time are standardized to a mean of 0 and a standard deviation of 1. Panel A of Table 6 shows the estimation results for total child time investments, whoever is present. Panels B and C show the estimation results for parental time investments measured as time spent with at least one parent, accounting for accessible time (Panel B), when the parent is (at least) present during the activity; and engaged time (Panel C), when the parent is involved during the activity. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families.

Estimations in Panel A of Table 6 show that a child's allocation of time (whoever is present or involved) is not affected by a change in family structure: children spend the same amount of time on the activities considered, although they slightly substitute active leisure for educational activities in single-mother families; and educational activities and housework for passive leisure and personal needs when there is a step-parent. Children do not seem to change their habits after a parental separation, although parents' time investments may be impacted by the separation. So, is time with at least one parent affected by a change in family structure?

Panels B and C report the estimates for the effect of family structure on time spent with at least one parent, accessible or engaged, respectively. Column 6 shows the estimates for the effect of family structure on time spent with at least one parent, whatever the activity the child is involved. Being in a single-mother family leads to a decrease of nearly 18% of a standard deviation in the time spent with at least one parent present. By comparison, having a primary care-giver who is a housewife leads to an increase of 25%. Results shows a decrease in time spent with at least one parent present in all activities, except active leisure time, especially in single-mother families. This is even more pronounced when there is a step-parent.

However, the decrease in accessible time does not reflect a decrease in engaged time. Estimation

results on engaged time (Panel C) reveal only a slight impact from a change in family structure. Estimated coefficients are negative (5% decrease for single mothers), but not significant even at a 10% level; this effect is driven by a decrease in time spent on (house)work with at least one parent involved in single-mother families ; and by a decrease in time spent on passive leisure and educational activities in single-mother families with a step-parent.

To clarify these findings, I break this impact down into time spent with the mother only, the father only and both parents together. Figures 1 and 2 show the breakdown of accessible and engaged parental time, respectively. One pattern emerges from these results. The custodial parent increases time spent alone with the child, but does not manage to compensate for the double decrease in time the child spends with both parents together, and time spent alone with the non-custodial parent. Looking at accessible time, time spent with the custodial parent actually decreases since she does not perfectly compensate for the decrease in time with both parents together. In other words, the custodial parent spends less time at home. A possible explanation is the budget constraint of single families that forces custodial parents to increase their number of working hours to cope with the cost of separation, resulting in reduced time resources for the child. Another explanation is a complementarity effect. One parent increases (decreases) the time spent with the child if the other parent increases (decreases) theirs. For example, instead of going to the supermarket as a family, the custodial parent may prefer to go on her own and leave the child at home or with another adult. In single-mother families, the breakdown of time spent with at least one parent engaged in the activity reveals that custodial parents aim to compensate at least for the time previously spent with both parents. This especially applies to activities considered essential to the child's development, such as personal needs and care, educational activities and active leisure. Single-father families do not show exactly the same pattern; however, there are not enough observations in this group to draw any strong conclusions.

To sum up, estimation results do not show any impact of a change in family structure on children's allocation of time (no matter who is there), nor any clear effect on time spent with at least one parent *involved*; but they do show a decrease in time with at least one parent *present*. In addition, the breakdown of accessible and engaged parental time is greatly affected; time spent with both parents together and alone with the non-custodial parent both decrease for most activities. One natural question is whether this average effect of a change in family structure on children's and parental time investments is the same for all families and for all children. I now explore whether

this effect holds universally by looking at two variables of interest: child’s age at separation and primary care-giver’s education.

4.2 Heterogeneity analysis

4.2.1 *Heterogeneity according to age at separation*

Several studies show that parental time input matters, especially in early childhood (Cunha & Heckman 2007, 2008; Cunha et al. 2010; Del Boca et al. 2017; Del Bono et al. 2016). Therefore, it is interesting to see whether parents react differently to the change in family structure if the child is young at the time of the separation. Since child’s age at separation is not available for all children, there is a smaller sample for this analysis. With few observations in each cell, I will focus on single-mother families, the most frequently observed. These results provide some insight into how child’s age at separation conditions the impact of a change in family structure.

Table 7 reports the effect of a change in family structure according to child’s age at parental separation. Looking at total time, whoever was present (Panel A), children whose parents separate when they are younger than six are less affected by a change in family structure, whereas those who experience separation after the age of six seem to substitute personal needs and active leisure for educational activities and passive leisure, in single-mother families.

Looking at time spent with at least one parent present (Panel B), children under six at separation are less affected, but the effect is still negative. They are not affected in time spent on educational activities.

Looking at Engaged Time (Panel C), across activities, the effect is close to zero for children under the age of six, except for work and housework in single-mother families. Time spent on educational activities tend to increase.

4.2.2 *Heterogeneity according to primary care-giver’s education*

Parents may react differently to a change in family structure depending on their education. In this section, I look at whether children whose primary care-giver is more highly educated are differently affected by a change in family structure. The PCG’s education mean and median are around the 13th grade. I define parents as more highly educated when they go beyond the 13th grade; 45% of the sample children have a more highly educated PCG.

Table 8 reports the effect of a change in family structure according to primary care-giver’s educa-

tion. While these effects are not statistically significant, in the absence of a substantial body of observations they may provide some insight into how the effect of parental separation vary with PCG's education.

Looking at total time, whoever was present (Panel A), children who live in a single-mother family spend less time on educational activities and passive leisure and, more time on work and housework when their primary care-giver is more highly educated.

Looking at time spent with at least one parent present during the activity (Panel B), children with a more highly educated PCG seem to be slightly more affected by a parental separation in single-mother families, especially with regard to leisure. This is more pronounced when there is a step-parent, children with a more highly educated PCG seem to be more affected by a parental separation in all activities.

Looking at engaged time (Panel C), the pattern is different. Children whose primary care-giver is more highly educated seem to be less affected in all activities, except passive leisure. This effect is reversed when there is a step-parent.

Results suggest that children whose primary care-giver is more highly educated are less affected with regard to engaged time by a change in family structure if they are in single-mother families. This does not hold if there is a step-parent, but it should be remembered that the definition of parental time excludes time spent with a parent if a step-parent is present.

4.3 Further Evidence: Time with Other Adults

So far, only parental time has been considered (exclusive definition), excluding time spent with one parent and another adult. However, this analysis could be extended to time spent with other adults such as a grandparent or a step-parent.

Figure 3 shows the effect of a change in family structure on time spent with at least one adult. The definition of parental time now includes time spent with at least one parent and another adult (inclusive definition). This last category is broken down into time spent with at least one parent (exclusive definition) and other parental time, i.e. time spent with at least one parent and someone else (a step-parent or a grandparent).

The time spent with at least one adult present decreases when the child lives in a single-parent family; this effect is however not statistically significant (Fig. 3a). Comparing the inclusive and the exclusive definitions of parental time, it is clear from Fig. 3a that the exclusive definition of parental time slightly over-estimates the effect of the change in family structure. This difference is

more pronounced for single mothers with a step-parent, those in the front line and who are likely to be the most affected by the under-estimation of parental time in the exclusive definition. Nevertheless, results remain similar. Looking at engaged time (Fig. 3b), there is no statistically significant effect on time spent with at least one parent, under either the exclusive or the inclusive definition. In a period where the nuclear family seems to be the norm, inter-generational links might come into play, absorbing some of the shock of parental separation (Deleire & Kalil 2002)¹⁷. According to Pilkauskas (2012), a larger share of single-mother families live in a three-generation family household. In comparison to married mothers, they are 4,7 times as likely to have live in a three-generation family household. Looking more precisely at time spent with the child, Dunifon et al. (2018) find that a larger share of children in single-parent families spend some time with their grand parents, and they spend more time with them ; but engaged time with a grandparent is the same in two-parents and single-parent families. Consistent with these findings, I find that the time spent with a grandparent (only), present and involved, increases in single-mother families, and other types of families ; however, it seems to decrease in single-father families (Fig. 3). It is however worthy to note that we have too few observations for these two last categories to be able to draw any strong conclusion. It suggests that the differences found between single-mother families and two-parents families in cross section studies are not due to unobserved characteristics of those families.

As mentioned before, the difference between the inclusive and the exclusive definition is much more pronounced for single-mother families with a step-parent, living or not with the child. This suggests that the time spent with the mother is also shared with other adults, eventually the step-parent. Step-parents might also spend some time alone with the child, acting as a recovery channel. Several studies find negative effect of having a step-parent on their step-children's outcomes as compared to their biological children, but these effects are not always statistically significant (Evenhouse & Reilly 2004; Gennetian 2005; Ginther & Pollak 2004). According to Hofferth & Anderson (2003), once selectivity on observable variables is eliminated, differences in paternal investments between step-fathers and biological fathers are small and not statistically significant. Indeed, time spent with a step-parent increases in single-parent families with a step-parent. Nevertheless, results do not suggest any accumulation of parental time when there is a step-parent ; the effect of a change in family structure on time spent with at least one adult in single-mother family is not statistically different when there is a step-parent (and even lower).

¹⁷Deleire & Kalil (2002) find that children who live in single-parent families with a grand-parent fare as good as children in two-parents families.

5 Concluding discussion

This paper examined whether a change in family structure impacts child and parental time investments. Five new findings emerge. First, a change in family structure has no impact on children’s allocation of their time (whoever is present): children do not change their allocation of time. Second, time with at least one parent present decreases. This second finding supports the *resource theories*, pointing to both a decreasing amount of resources available to children and a loss of consumption and production complementarities. However, estimations do not indicate a strong effect on time spent with at least one parent involved; this is consistent with the existence of compensation effects. Third, the breakdown of accessible and engaged parental time is highly affected. Time spent with both parents together and alone with the non-custodial parent both decrease in most activities¹⁸. The custodial parent compensates partially for the decrease in time spent with the non-custodial parent, and seeks to maintain the amount of quality time. This suggests a certain degree of complementarity between father and mother time in these families. Although, since substitution is high when we look at parental involvement, the custodial parent’s time constraint may be a better explanation for this partial substitution.

Fourth, children who were younger when the separation occurred seem to be less affected by the decrease in time spent with at least one parent. This is in line with compensation theories: with younger children requiring more parental time, the custodial parent may substitute parental time for their own leisure time. Results are less clear-cut for children whose primary care-giver is more highly educated. They seem less affected with regard to engaged time if they are in single-mother families but this does not hold for accessible time.

Fifth, time spent with at least one adult present also decreases, but the effect is not statistically significant. Time spent with grandparents partially act as a recovery channel. The presence of a step-parent does not lead to an accumulation of time spent with an adult. Mothers spend on average less time with their child when they have a new partner, but the difference is not statistically significant. Therefore there is no evidence of either a complementarity effect regarding time spent with a step-parent or a loss of bargaining power due to the presence of a step-parent.

Several studies highlight the importance of time spent with parents in early childhood for the child’s skill acquisition (Del Boca et al. 2017; Del Bono et al. 2016; Fiorini & Keane 2014). The av-

¹⁸This might be less the case for younger cohorts. The share of fathers who had no contact with their child after a separation has decreased; and involved fathers spend more time with their kids after a separation in younger cohorts (Westphal et al. 2014).

erage decrease in time spent with at least one parent present might have adverse effects on the child's development. Even if the custodial parent seeks to maintain quality time, the change in the breakdown of parental time might also negatively affect the child. Little attention has been paid to how the breakdown of parental time might affect a child's development. Research needs to look at whether time spent with the mother and the father are substitutes rather than complements in a child's skill development.

While there has long been evidence for the economic difficulties of single parents, this study reveals their time constraint. Labor market policies supporting reduced working hours or more flexible schedules, for example through teleworking, might curb the decrease in time spent with at least one parent after parental separation. On the other hand, such policies might have adverse effects, negatively impacting the mother's future labor market outcomes. Since single-mother families are far more common than single-father families, this kind of policy might exacerbate gender discrimination on the labor market. For this reason, they should be accompanied by policies fostering alternating custody. Other measures, such as developing transport infrastructures to reduce the time parents spend traveling, might also help them spend more time with their children.

References

- Agostinelli, F., & Sorrenti, G. (2018). Money vs. time: family income, maternal labor supply, and child development. *University of Zurich, Department of Economics, Working Paper(273)*.
- Aizer, A. (2004). Home alone: supervision after school and child behavior. *Journal of Public Economics*, 88(9-10), 1835–1848. doi: 10.1016/S0047-2727(03)00022-7
- Amato, P. R. (2010). Research on Divorce: Continuing Trends and New Developments. *Journal of Marriage and Family*, 72(3), 650–666. doi: 10.1111/j.1741-3737.2010.00723.x
- Anderson, S. E., Sacker, A., Whitaker, R. C., & Kelly, Y. (2017). Self-regulation and household routines at age three and obesity at age eleven: longitudinal analysis of the UK Millennium Cohort Study. *International Journal of Obesity*, 41(10), 1459–1466. doi: 10.1038/ijo.2017.94
- Arbor, Ann, MI, Panel Study of Income Dynamics - Child Development Supplement. (2017). *Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan*. Retrieved from <https://psidonline.isr.umich.edu>

- Barg, K., & Beblo, M. (2012). Does "sorting into specialization" explain the differences in time use between married and cohabiting couples? an empirical application for germany. *Annals of Economics and Statistics*, 127–152. doi: 10.2307/23646459
- Bargain, O., González, L., Keane, C., & Özcan, B. (2012). Female labor supply and divorce: New evidence from Ireland. *European Economic Review*, 56(8), 1675–1691. doi: 10.1016/j.euroecorev.2012.08.007
- Becker, G. S. (1965). A Theory of the Allocation of Time. *The Economic Journal*, 75(299), 493. doi: 10.2307/2228949
- Bianchi, S. M., Lesnard, L., Nazio, T., & Raley, S. (2014). Gender and time allocation of cohabiting and married women and men in France, Italy, and the United States. *Demographic Research*, 31(1), 183–216. doi: 10.4054/DemRes.2014.31.8
- Bibler, A. J. (2020). Household composition and gender differences in parental time investments. *Demography*, 1–21. doi: 10.1007/s13524-020-00901-8
- Björklund, A., Ginther, D., & Sundström, M. (2007). Family structure and child outcomes in the USA and Sweden. *Journal of population economics*, 20(1), 183–201. doi: 10.1007/s00148-006-0094-7
- Björklund, A., & Sundström, M. (2006). Parental separation and children's educational attainment: A siblings analysis on Swedish register data. *Economica*, 73(292), 605–624. doi: 10.1111/j.1468-0335.2006.00529.x
- Blundell, R., Chiappori, P., & Meghir, C. (2005). Collective Labor Supply with Children. *Journal of Political Economy*, 113(6), 1277–1306. doi: 10.1086/491589
- Bruins, M. (2017). Women's economic opportunities and the intra-household production of child human capital. *Labour Economics*, 44, 122–132. doi: 10.1016/j.labeco.2016.12.007
- Carlson, M. J., & Berger, L. M. (2013). What Kids Get from Parents: Packages of Parental Involvement across Complex Family Forms. *Social Service Review*, 87(2), 213–249. doi: 10.1086/671015
- Chiappori, P.-A. (1988). Rational Household Labor Supply. *Econometrica*, 56(1), 63. doi: 10.2307/1911842

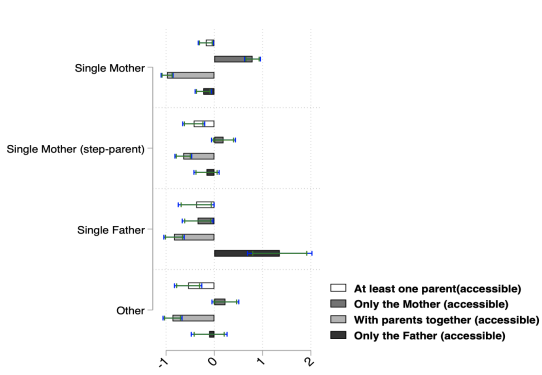
- Couprie, H. (2007). Time Allocation Within the Family: Welfare Implications of Life in a Couple. *The Economic Journal*, 117(516), 287–305. doi: 10.1111/j.1468-0297.2007.02012.x
- Couprie, H., & Ferrant, G. (2015). Welfare Comparisons, Economies of Scale and Equivalence Scale in Time Use. *Annals of Economics and Statistics*(117/118), 185. doi: 10.15609/annaeconstat2009.117-118.185
- Cunha, F., & Heckman, J. (2007). The Technology of Skill Formation. *The American Economic Review*, 97(2), 31–47. doi: 10.1257/aer.97.2.31
- Cunha, F., & Heckman, J. J. (2008). Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation. *Journal of Human Resources*, 43(4), 738–782. doi: 10.3368/jhr.43.4.738
- Cunha, F., Heckman, J. J., & Schennach, S. M. (2010). Estimating the Technology of Cognitive and Noncognitive Skill Formation. *Econometrica*, 78(3), 883–931. doi: 10.3982/ECTA6551
- Del Boca, D., Monfardini, C., & Nicoletti, C. (2017). Parental and Child Time Investments and the Cognitive Development of Adolescents. *Journal of Labor Economics*, 35(2), 565–608. doi: 10.1086/689479
- Del Bono, E., Francesconi, M., Kelly, Y., & Sacker, A. (2016). Early Maternal Time Investment and Early Child Outcomes. *The Economic Journal*, 126(596), F96–F135. doi: 10.1111/econj.12342
- Deleire, T., & Kalil, A. (2002). Good things come in threes: Single-parent multigenerational family structure and adolescent adjustment. *Demography*, 39(2), 393–413. doi: 10.1353/dem.2002.0016
- Dunifon, R. E., Near, C. E., & Ziol-Guest, K. M. (2018). Backup Parents, Playmates, Friends: Grandparents' Time With Grandchildren: Grandparents' Time. *Journal of Marriage and Family*, 80(3), 752–767. doi: 10.1111/jomf.12472
- Ermisch, J., & Francesconi, M. (2001a). Family matters: Impacts of family background on educational attainments. *Economica*, 68(270), 137-156. doi: 10.1111/1468-0335.00239
- Ermisch, J., & Francesconi, M. (2001b). Family structure and children's achievements. *Journal of population economics*, 14(2), 249–270. doi: 10.1007/s001480000

- Ermisch, J., & Pronzato, C. (2008). Intra-Household Allocation of Resources: Inferences from Non-resident Fathers' Child Support Payments. *The Economic Journal*, *118*(527), 347–362. doi: 10.1111/j.1468-0297.2007.02124.x
- Evenhouse, E., & Reilly, S. (2004). A sibling study of stepchild well-being. *Journal of Human Resources*, *39*(1), 254–282. doi: 10.3368/jhr.XXXIX.1.248
- Fiorini, M., & Keane, M. P. (2014). How the Allocation of Children's Time Affects Cognitive and Noncognitive Development. *Journal of Labor Economics*, *32*(4), 787–836. doi: 10.1086/677232
- Francesconi, M., Jenkins, S. P., & Siedler, T. (2010). Childhood family structure and schooling outcomes: Evidence for Germany. *Journal of Population Economics*, *23*(3), 1073–1103. doi: 10.1007/s00148-009-0242-y
- Frimmel, W., Halla, M., & Winter-ebmer, R. (2016). How Does Parental Divorce Affect Children's Long-term Outcomes ? *IZA Discussion Papers*.
- Funk, P., & Kemper, T. (2016). *Leisure and Learning - Activities and Their Effects on Child Skill Development* (Working Paper Series in Economics No. 85). University of Cologne, Department of Economics.
- Genadek, K. R., Stock, W. A., & Stoddard, C. (2007). No-Fault Divorce Laws and the Labor Supply of Women with and without Children. *Journal of Human Resources*, *XLII*(1), 247–274. doi: 10.3368/jhr.XLII.1.247
- Gennetian, L. A. (2005). One or two parents? Half or step siblings? The effect of family structure on young children's achievement. *Journal of Population Economics*, *18*(3), 415–436. doi: 10.1007/s00148-004-0215-0
- Ginther, D. K., & Pollak, R. A. (2004). Family structure and children's achievements. *Demography*, *41*(4), 671–696. doi: 10.1007/s001480000028
- Goisis, A., Özcan, B., & Van Kerm, P. (2019). Do Children Carry the Weight of Divorce? *Demography*, *56*(3), 785–811. doi: 10.1007/s13524-019-00784-4
- González, L., & Viitanen, T. (2018). The long-term effects of legalizing divorce on children. *Oxford Bulletin of Economics and Statistics*, *80*(2), 327–357. doi: 10.1111/obes.12200

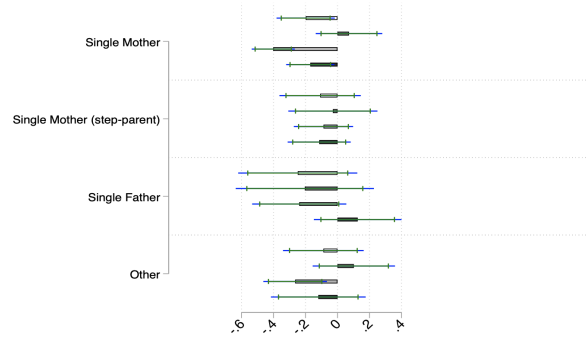
- Gruber, J. (2004). Is Making Divorce Easier Bad for Children ? The Long-Run Implications of Unilateral Divorce. *Journal of Labor Economics*, 22(4), 799–833. doi: 10.1086/423155
- Grätz, M. (2017). Does Separation Really Lead Fathers and Mothers to be Less Involved in their Children’s Lives? *European Sociological Review*, 33(4), 551–562. doi: 10.1093/esr/jcx058
- Hofferth, S. L. (2006). Residential father family type and child well-being: Investment versus selection. *Demography*, 43(1), 53–77. doi: 10.1353/dem.2006.0006
- Hofferth, S. L., & Anderson, K. G. (2003). Are all dads equal ? Biology versus Marriage as a Basis for Paternal Investment. *Journal of Marriage and Family*(65), 213–232. doi: 10.1111/j.1741-3737.2003.00213.x
- Hofferth, S. L., & Sandberg, J. F. (2001). How American Children spend their time. *Journal of Marriage and Family*, 63(2), 295–308. doi: 10.1111/j.1741-3737.2001.00295.x
- Hsin, A., & Felfe, C. (2014). When Does Time Matter? Maternal Employment, Children’s Time With Parents, and Child Development. *Demography*, 51(5), 1867–1894. doi: 10.1007/s13524-014-0334-5
- Juster, F. T., Ono, H., & Stafford, F. P. (2003). An Assessment of Alternative Measures of Time Use. *Sociological Methodology*, 33(1), 19–54. doi: 10.1111/j.0081-1750.2003.t01-1-00126.x
- Kalenkoski, C. M., Ribar, D., & Stratton, L. S. (2011). Chapter 1: How do adolescents spend time use? an alternative methodological approach for analyzing time-diary data. *Research in labor economics*, 33, 1–44.
- Kalenkoski, C. M., Ribar, D. C., & Stratton, L. S. (2005). Parental child care in single-parent, cohabiting, and married couple families: Time diary evidence from the United Kingdom. *American Economic Review: : Papers and Proceedings*, 95(2).
- Kalenkoski, C. M., Ribar, D. C., & Stratton, L. S. (2007). The effect of family structure on parents’ child care time in the United States and the United Kingdom. *Review of Economics of the Household*, 5(4), 353–384. doi: 10.1007/s11150-007-9017-y
- Kalil, A., Ryan, R., & Chor, E. (2014). Time Investments in Children across Family Structures. *The Annals of the American Academy of Political and Social Science*, 654(1), 150–168. doi: 10.1177/0002716214528276

- Kendig, S. M., & Bianchi, S. M. (2008). Single, Cohabiting, and Married Mothers' Time With Children. *Journal of Marriage and Family*, 70(5), 1228–1240. doi: 10.1111/j.1741-3737.2008.00562.x
- Le Bourdais, C., & Rapoport, B. (2001). Temps parental et formes familiales. *Loisir et Société*, 24(2), 585–617. doi: 10.7202/000196ar
- Le Forner, H. (2020). Age At Parents' Separation And Children Achievement: Evidence From France Using A Sibling Approach. *Annals of Economics and Statistics*(138), 107–163. doi: 10.15609/annaeconstat2009.138.0107
- Lundberg, S., & Pollak, R. A. (1996). Bargaining and Distribution in Marriage. *The Journal of Economic Perspectives*, 10(4), 139–158. doi: 10.1257/jep.10.4.139
- Lundberg, S., Pollak, R. A., & Wales, T. J. (1997). Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit. *The Journal of Human Resources*, 32(3), 463. doi: 10.2307/146179
- Løken, K. V., Lommerud, K. E., & Holm Reiso, K. (2018). Single mothers and their children: Evaluating a work-encouraging welfare reform. *Journal of Public Economics*, 167, 1–20. doi: 10.1016/j.jpubeco.2018.09.003
- McLanahan, S., Tach, L., & Schneider, D. (2013). The Causal Effects of Father Absence. *Annual Review of Sociology*, 39(1), 399–427. doi: 10.1146/annurev-soc-071312-145704
- Mencarini, L., Pasqua, S., & Romiti, A. (2017). Single-mother families and the gender gap in children's time investment and non-cognitive skills. *Review of Economics of the Household*, 1–28. (Publisher: Springer US) doi: 10.1007/s11150-017-9385-x
- Pailhé, A., & Solaz, A. (2004). Le temps parental est-il transférable entre conjoints ? *Revue économique*, 55(3), 601–610. doi: 10.3917/reco.553.0601
- Pilkaskas, N. V. (2012). Three-Generation Family Households: Differences by Family Structure at Birth. *Journal of Marriage and Family*, 74(5), 931–943. doi: 10.1111/j.1741-3737.2012.01008.x
- Pronzato, C., & Aassve, A. (2019). Parental breakup and children's development: The role of time and of post-separation conditions. *Review of Economics of the Household*, 17(1), 67–87. doi: 10.1007/s11150-017-9396-7

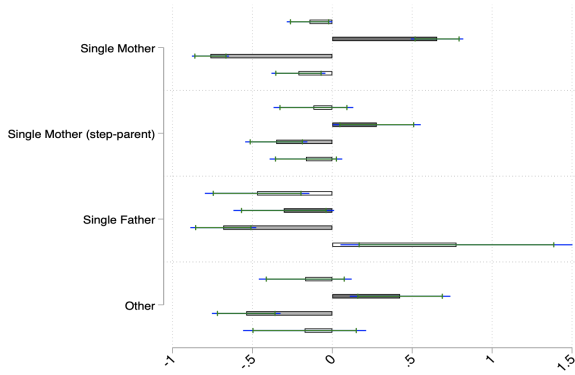
- Ribar, D. C., Sanders, S., & Thibout, C. (2017). *Dissolution , Conflict and Australian Children's Developmental Outcomes*.
- Van Soest, A., & Stancanelli, E. (2012). Retirement and Home Production: A Regression Discontinuity Approach. *The American Economic Review (Papers and Proceedings)*, *102*(3), 600–605. doi: 10.1257/aer.102.3.600
- Westphal, S. K., Poortman, A.-R., & van der Lippe, T. (2014). Non-resident Father-Child Contact across Divorce Cohorts: The Role of Father Involvement during Marriage. *European Sociological Review*, *30*(4), 444–456. doi: 10.1093/esr/jcu050
- White, L., & Gilbreth, J. G. (2001). When Children Have Two Fathers: Effects of Relationships With Stepfathers and Noncustodial Fathers on Adolescent Outcomes. *Journal of Marriage and Family*, *63*(1), 155–167. doi: 10.1111/j.1741-3737.2001.00155.x
- Özcan, B., & Breen, R. (2012). Marital Instability and Female Labor Supply. *Annual Review of Sociology*, *38*(1), 463–481. doi: 10.1146/annurev-soc-071811-145457



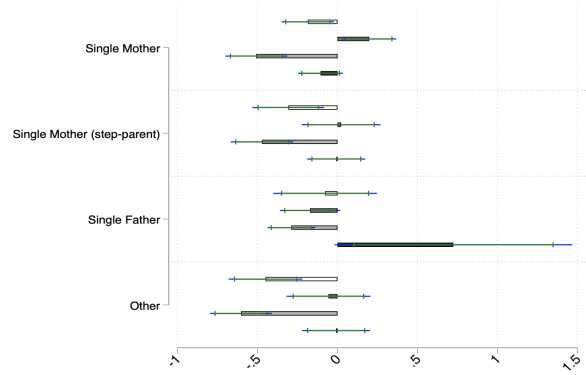
(a) Effect of Family Structure on Time spent with Parents (Accessible Time)



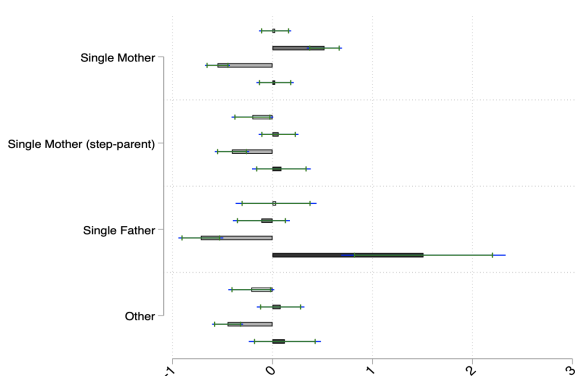
(b) Effect of Family Structure on Time spent on Household Tasks (Accessible Time)



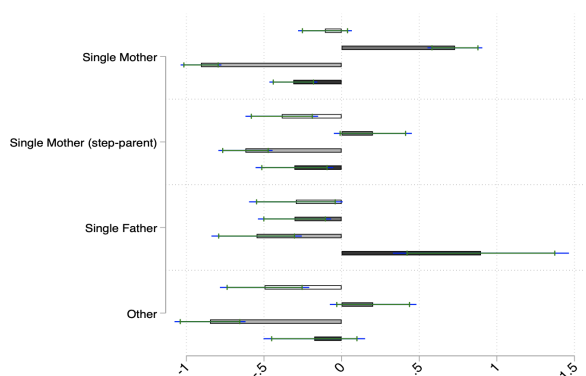
(c) Effect of Family Structure on Time spent on Personal Needs and Care (Accessible Time)



(d) Effect of Family Structure on Time spent on Educational Activities (Accessible Time)

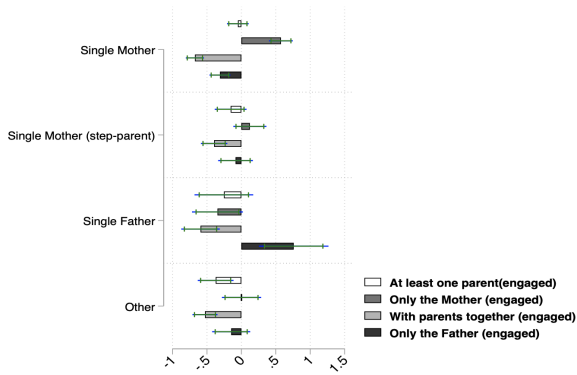


(e) Effect of Family Structure on Time spent on Active Leisure (Accessible Time)

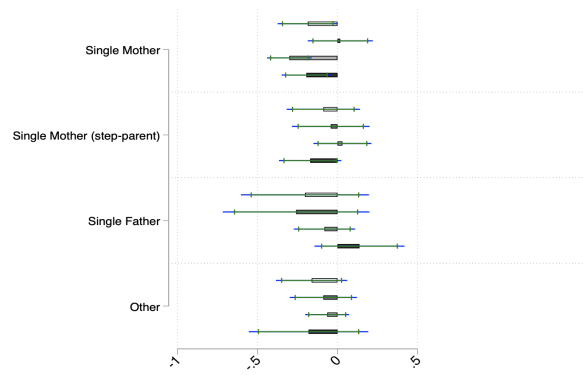


(f) Effect of Family Structure on Time spent on Passive Leisure (Accessible Time)

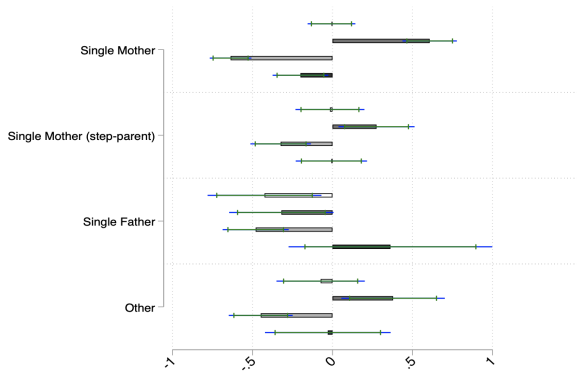
Fig. 1 Breakdown of the effect of a change in family structure on time with at least one parent (Accessible Time) for each activity. *Notes:* Results from a child fixed-effect model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families.



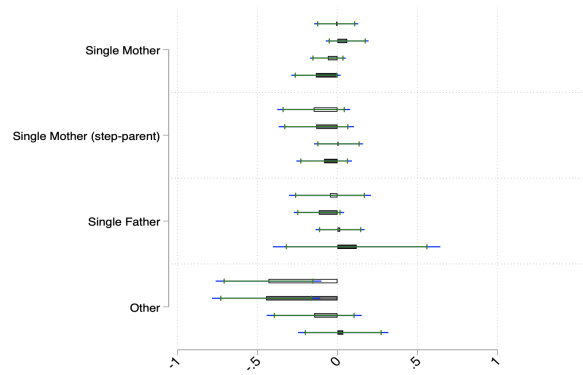
(a) Effect of Family Structure on Time spent with Parents (Engaged Time)



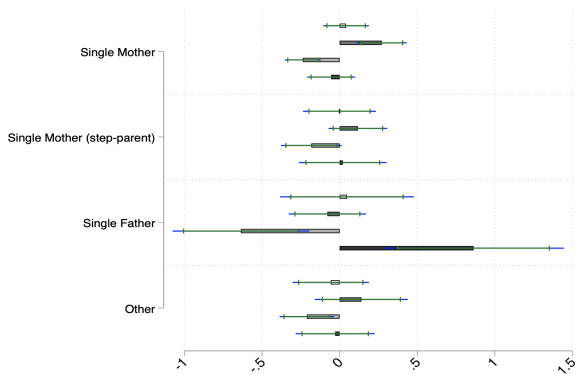
(b) Effect of Family Structure on Time spent on Household Tasks (Engaged Time)



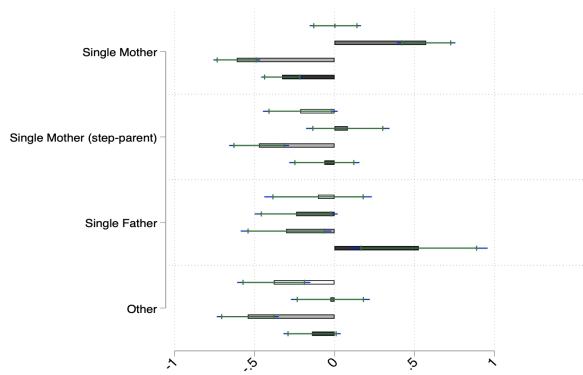
(c) Effect of Family Structure on Time spent on Personal Needs and Care (Engaged Time)



(d) Effect of Family Structure on Time spent on Educational Activities (Engaged Time)

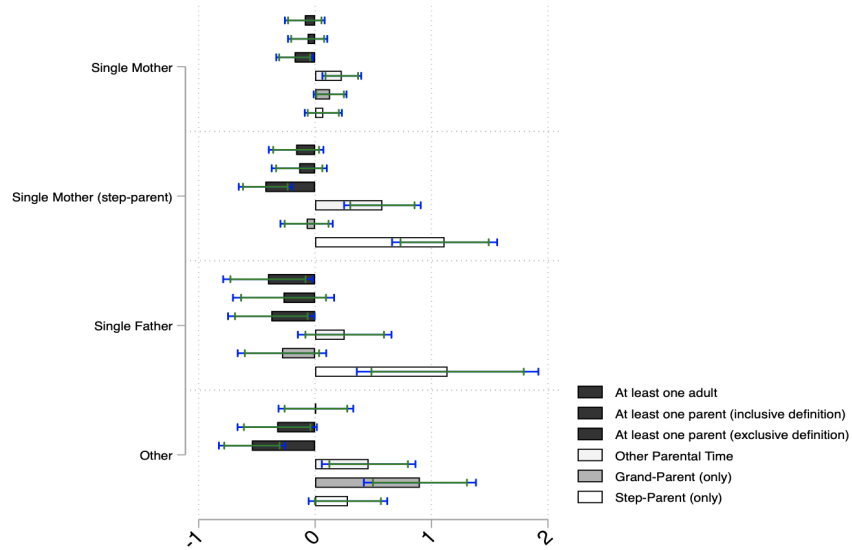


(e) Effect of Family Structure on Time spent on Active Leisure (Engaged Time)

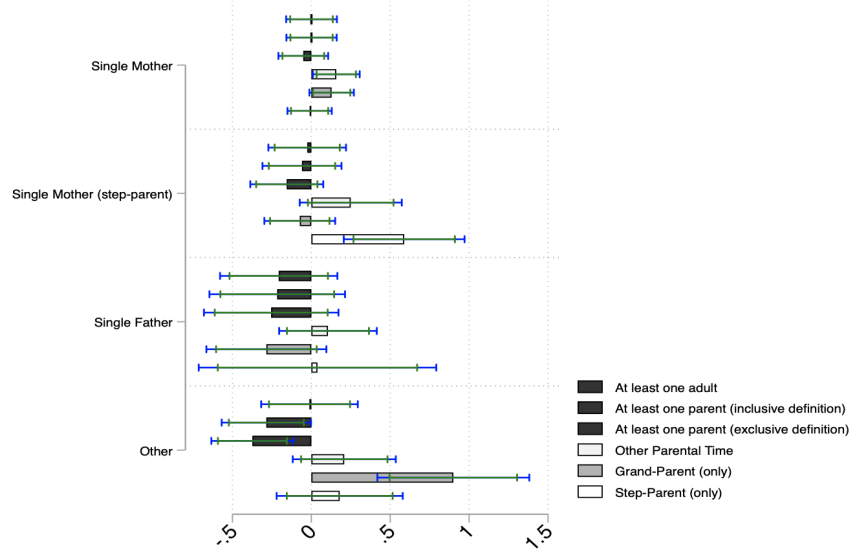


(f) Effect of Family Structure on Time spent on Passive Leisure (Engaged Time)

Fig. 2 Breakdown of the effect of a change in family structure on time with at least one parent (Engaged Time) for each activity. *Notes:* Results from a child fixed-effect model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families.



(a) Effect of a Change in Family Structure on Time Spent with Adult (Accessible Time)



(b) Effect of a Change in Family Structure on Time Spent with Adult (Engaged Time)

Fig. 3 Effect of a Change in Family Structure on Time with at least one adult. *Notes:* Results from a child fixed-effect model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families. The inclusive definition of parental time includes time spent with at least one parent and another adult. This last category is broken down into time spent with at least one parent (exclusive definition) and other parental time, i.e. time spent with at least one parent and someone else (a step-parent or a grandparent).

Table 1. Sample Selection: Descriptive statistics

	(1)	(2)	(3)	(4)
	No Missing Data	Excluding Outliers	Enough Variation in Family Structure	At Least Two Observations
	mean	mean	mean	mean
Age	10.42	10.34	10.36	10.54
Female	0.50	0.50	0.51	0.52
White	0.68	0.68	0.73	0.74
African american	0.13	0.13	0.08	0.08
Hispanic	0.13	0.13	0.14	0.14
Asian Pacific	0.02	0.02	0.02	0.02
American Indian	0.00	0.00	0.00	0.00
Other	0.04	0.04	0.03	0.03
Two Parents	0.71	0.71	0.85	0.84
Single Mother	0.18	0.18	0.07	0.08
Single Mother (step-parent)	0.05	0.05	0.05	0.05
Single Father	0.03	0.02	0.02	0.02
Other	0.03	0.03	0.01	0.02
PCG - Worker	0.68	0.68	0.69	0.70
PCG - Looking for work	0.04	0.04	0.04	0.03
PCG - Housewife	0.24	0.24	0.25	0.24
PCG - Student	0.02	0.02	0.02	0.02
PCG - Other	0.01	0.01	0.01	0.01
PCG Education	13.04	13.03	13.13	13.18
Earnings	18045.97	17948.64	18411.03	18980.71
Observations	5264	5153	4029	3687

Notes: This Table reports the summary statistics for the sample for whom we have all the relevant information (column 1), for whom we have excluded outliers in terms of allocation of time (column 2) and for whom we have enough variation in the family structure to be able to perform a child fixed effect analysis (column 3) and, for whom we have at least two observations (column 4). See Section 3.1.1 for more details. For all samples, weighting is used to ensure the initial sample is representative of the US population.

Source: Estimation samples drawn from the PSID - CDS.

Table 2. Summary Statistics - Weekly Time (in hours) in Each Activity

	1st wave				2nd wave				3rd wave			
	mean	sd	min	max	mean	sd	min	max	mean	sd	min	max
(House)Work	5.63	5.94	0	49	7.35	9.41	0	84	6.62	7.86	0	81
Personal needs	94.99	16.47	52	155	83.91	11.40	52	133	79.12	11.16	51	133
Education	22.44	18.79	0	78	33.80	16.44	0	78	36.24	12.77	0	71
Active Leisure	23.21	12.46	0	81	19.52	11.88	0	78	22.09	12.45	0	68
Passive Leisure	21.72	11.34	0	86	23.31	11.48	1	88	23.91	12.12	1	79
Observations	1508				1386				793			

Notes: This Table shows the summary statistics on time-use for all children for each wave.

Weighting is used to ensure the initial sample is representative of the US population.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section [3.1.1](#).

Table 3. Summary Statistics - Weekly Time (in hours) According to Who is Involved With The Child

Panel A: Breakdown of a Child's Weekly Time According to Who Is Involved With The Child

	1st wave				2nd wave				3rd wave			
	mean	sd	min	max	mean	sd	min	max	mean	sd	min	max
At least one adult	33.49	18.16	0	101	21.90	13.89	0	92	18.25	13.07	0	101
Alone	11.17	11.08	0	70	17.12	14.07	0	76	20.03	12.72	0	73
Not Relevant	79.23	10.13	45	127	104.65	13.67	62	129	104.67	11.79	49	129
Other	44.11	23.01	-0	115	24.33	15.31	-0	93	25.05	14.93	-0	81
Observations	1508				1386				793			

Panel B: Breakdown of a Child's Weekly Time With At Least One Adult

	1st wave				2nd wave				3rd wave			
	mean	sd	min	max	mean	sd	min	max	mean	sd	min	max
At least with one parent	29.60	16.49	0	101	19.80	13.42	0	92	15.50	11.14	0	71
Other parental time	1.89	5.46	0	87	1.21	4.07	0	57	1.98	7.53	0	95
With the grandparent (alone)	1.98	6.60	0	83	0.76	3.41	0	42	0.69	3.55	0	49
With the stepmother (alone)	0.02	0.65	0	46	0.03	0.62	0	18	0.01	0.38	0	13
With the stepfather (alone)	0.01	0.17	0	7	0.10	1.31	0	32	0.06	0.66	0	15
Other Adult Time	0.00	0.00	-0	0	0.00	0.01	-0	2	0.00	0.06	-0	2
Observations	1508				1386				793			

Panel C: Breakdown of a Child's Weekly Time With At Least One Parent

	1st wave				2nd wave				3rd wave			
	mean	sd	min	max	mean	sd	min	max	mean	sd	min	max
With the mother (alone)	15.72	13.30	0	76	8.80	9.38	0	62	7.13	7.92	0	71
With the father (alone)	5.56	7.53	0	59	3.61	5.61	0	39	3.07	5.24	0	34
With both parents together	8.32	8.23	0	72	7.39	9.23	0	88	5.30	7.21	0	48
Other parental time	1.89	5.46	0	87	1.21	4.07	0	57	1.98	7.53	0	95
Observations	1508				1386				793			

Notes: This Table shows the summary statistics on time-use for all children for each wave. Weighting is used to ensure the initial sample is representative of the US population. In Panel A, "Not Revelevant" means that the child is supposed to do the activity on his own ; and "Other" means that the child is doing the activity with a relative or a non relative for whom we do not have any information on the age. In Panel B and C, "other parental time" means that at least one parent is involved and somebody else (e.g. a grandparent or a stepparent) ; "other adult time" denotes time spent with an adult (else than a parent) and someone else.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section [3.1.1](#).

Table 4. Transitions in family structures from 1997 to 2002 and from 2002 to 2007

		Family structure in wave 2						
Family structure in wave 1		Two parents	Single Mother	Single Mother with SP	Single Father	Other	Attrition	Total
		Two parents	1033	107	20	21	5	106
	Single Mother	29	18	61	6	13	17	144
	Single Mother with a step parent	5	15	2	0	5	4	31
	Single Father	3	0	4	0	3	4	14
	Other	2	10	7	1	2	5	27
	New individuals	14	0	0	0	0		14
	Total	1086	150	94	28	28	136	1522
		Family structure in wave 3						
Family structure in wave 2		Two parents	Single Mother	Single Mother with SP	Single Father	Other	Attrition	Total
		Two parents	460	41	5	9	5	566
	Single Mother	13	24	19	1	6	87	150
	Single Mother with a step parent	1	11	31	0	5	46	94
	Single Father	2	2	0	10	1	13	28
	Other	0	4	3	0	4	17	28
	Unknown (A_13)	67	26	24	6	13		136
	Total	543	108	82	26	34	729	1522

Notes: This Table shows the number of observations by family structure, according to their family structure in the previous wave.

Children who are observed only in first and third waves are counted in the attrition column.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1.

Table 5. Summary Statistics

	1st wave				2nd wave				3rd wave			
	mean	sd	min	max	mean	sd	min	max	mean	sd	min	max
Age	6.32	3.67	0	14	12.08	3.76	6	19	14.43	2.24	11	19
Female	0.52	0.50	0	1	0.52	0.50	0	1	0.51	0.50	0	1
White	0.74	0.44	0	1	0.73	0.44	0	1	0.75	0.44	0	1
African american	0.08	0.27	0	1	0.08	0.26	0	1	0.07	0.25	0	1
Hispanic	0.13	0.34	0	1	0.14	0.35	0	1	0.14	0.35	0	1
Asian Pacific	0.02	0.13	0	1	0.02	0.13	0	1	0.02	0.15	0	1
American Indian	0.00	0.03	0	1	0.00	0.04	0	1	0.00	0.00	0	0
Other	0.03	0.17	0	1	0.03	0.18	0	1	0.02	0.15	0	1
Two Parents	0.89	0.31	0	1	0.83	0.37	0	1	0.76	0.43	0	1
Single Mother	0.07	0.26	0	1	0.08	0.26	0	1	0.09	0.29	0	1
Single Mother (step-parent)	0.02	0.12	0	1	0.06	0.24	0	1	0.09	0.28	0	1
Single Father	0.01	0.08	0	1	0.02	0.14	0	1	0.03	0.18	0	1
Other	0.01	0.10	0	1	0.01	0.11	0	1	0.03	0.17	0	1
PCG - Worker	0.64	0.48	0	1	0.71	0.46	0	1	0.78	0.42	0	1
PCG - Looking for work	0.04	0.19	0	1	0.03	0.17	0	1	0.04	0.19	0	1
PCG - Housewife	0.29	0.45	0	1	0.23	0.42	0	1	0.17	0.38	0	1
PCG - Student	0.03	0.16	0	1	0.02	0.12	0	1	0.01	0.08	0	1
PCG - Other	0.00	0.07	0	1	0.02	0.14	0	1	0.00	0.06	0	1
PCG Education	13.13	2.85	0	17	13.13	2.93	0	17	13.36	3.01	0	17
Earnings	14280.64	20986.72	0	375000	20721.59	26577.36	0	300000	23299.81	26141.60	0	175000
Observations	1508				1386				793			

Notes: This Table shows the summary statistics for all individuals for each wave. Weighting is used to ensure the initial sample is representative of the US population.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1.

Table 6. Effect of Family Structure on Child and Parental Time Investments

<i>Panel A : Total Time (whoever was present)</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	
Single Mother	-0.02 (0.09)	0.05 (0.08)	-0.10 (0.08)	0.07 (0.08)	-0.03 (0.08)	
Single Mother (step-parent)	0.07 (0.12)	-0.08 (0.12)	0.11 (0.11)	-0.00 (0.12)	-0.14 (0.11)	
Single Father	-0.04 (0.17)	0.13 (0.15)	0.17 (0.20)	-0.14 (0.19)	-0.15 (0.14)	
Other	0.05 (0.14)	0.20 (0.14)	-0.11 (0.15)	-0.02 (0.16)	-0.10 (0.14)	
Constant	0.19 (0.31)	-0.44 (0.37)	0.70† (0.41)	-0.42 (0.39)	0.05 (0.41)	
Observations	3687	3687	3687	3687	3687	
Nb of Clusters	1522	1522	1522	1522	1522	
<i>Panel B : Time with at least One Parent : Accessible Time</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.20* (0.09)	-0.14* (0.07)	-0.19* (0.08)	0.03 (0.08)	-0.11 (0.09)	-0.18* (0.08)
Single Mother (step-parent)	-0.11 (0.13)	-0.12 (0.13)	-0.31** (0.11)	-0.20† (0.11)	-0.39** (0.12)	-0.43*** (0.12)
Single Father	-0.25 (0.19)	-0.47** (0.17)	-0.08 (0.17)	0.04 (0.21)	-0.29† (0.15)	-0.38* (0.19)
Other	-0.09 (0.13)	-0.17 (0.15)	-0.45*** (0.12)	-0.21† (0.12)	-0.50*** (0.15)	-0.54*** (0.14)

Continued on next page

Table 6 – Continued from previous page

Constant	-0.11 (0.34)	0.25 (0.47)	0.07 (0.34)	-0.28 (0.41)	-0.58 (0.42)	-0.43 (0.42)
Observations	3687	3687	3687	3687	3687	3687
Nb of Clusters	1522	1522	1522	1522	1522	1522

Panel C : Time with at least One Parent : Engaged Time

	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.19† (0.10)	-0.01 (0.08)	-0.01 (0.07)	0.04 (0.07)	0.01 (0.08)	-0.05 (0.08)
Single Mother (step-parent)	-0.09 (0.12)	-0.02 (0.11)	-0.15 (0.12)	-0.00 (0.12)	-0.21† (0.12)	-0.16 (0.12)
Single Father	-0.20 (0.20)	-0.43* (0.18)	-0.05 (0.13)	0.05 (0.22)	-0.10 (0.17)	-0.25 (0.22)
Other	-0.16 (0.11)	-0.07 (0.14)	-0.43* (0.17)	-0.06 (0.13)	-0.38** (0.12)	-0.37** (0.13)
Constant	-0.05 (0.35)	0.23 (0.46)	-0.23 (0.34)	0.33 (0.40)	-0.35 (0.35)	-0.08 (0.43)
Observations	3687	3687	3687	3687	3687	3687
Nb of Clusters	1522	1522	1522	1522	1522	1522

Notes: Individual Fixed-Effect Model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families. Clustered standard errors in parentheses. † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1.

Table 7. Effect of Family Structure on Child and Parental Time Investments: heterogeneity according to age at parental separation

<i>Panel A : Total Time (whoever was present)</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	
Single Mother	0.06 (0.13)	0.24* (0.11)	-0.20† (0.12)	0.15 (0.12)	-0.18† (0.10)	
Single Mother=1 × < 6 at separation	-0.03 (0.23)	-0.33† (0.18)	0.05 (0.19)	-0.08 (0.19)	0.25 (0.17)	
Single Mother (SP)	-0.17 (0.25)	-0.12 (0.20)	0.15 (0.19)	-0.24† (0.14)	0.31 (0.22)	
Single Mother (SP)=1 × < 6 at separation	0.23 (0.34)	-0.04 (0.28)	-0.07 (0.26)	0.38 (0.24)	-0.61* (0.27)	
Single Father	0.05 (0.25)	0.10 (0.29)	-0.15 (0.35)	0.13 (0.28)	-0.13 (0.22)	
Single Father=1 × < 6 at separation	-0.05 (0.35)	0.02 (0.33)	0.22 (0.41)	-0.29 (0.37)	0.11 (0.25)	
Other	0.12 (0.52)	0.49 (0.34)	-0.74 (0.48)	0.83* (0.41)	-0.46† (0.25)	
Other=1 × < 6 at separation	-0.45 (0.62)	-0.36 (0.45)	0.78 (0.55)	-1.00† (0.53)	0.67† (0.35)	
Observations	3395	3395	3395	3395	3395	
Nb of Clusters	1453	1453	1453	1453	1453	
<i>Panel B : Time with at least One Parent : Accessible Time</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.20† (0.11)	-0.13 (0.09)	-0.38** (0.14)	0.01 (0.13)	-0.23† (0.13)	-0.27* (0.11)

Continued on next page

Table 7 – *Continued from previous page*

Single Mother=1 × < 6 at separation	0.04 (0.24)	-0.14 (0.16)	0.42* (0.18)	-0.01 (0.19)	0.03 (0.18)	0.07 (0.17)
Single Mother (SP)	-0.23 (0.27)	-0.21 (0.18)	-0.58* (0.25)	-0.42* (0.17)	-0.17 (0.26)	-0.53* (0.26)
Single Mother (SP)=1 × < 6 at separation	0.07 (0.37)	0.04 (0.28)	0.57† (0.30)	0.15 (0.25)	-0.45 (0.32)	-0.01 (0.32)
Single Father	-0.54† (0.30)	-0.54† (0.30)	-0.25 (0.19)	0.20 (0.37)	-0.44† (0.23)	-0.52 (0.32)
Single Father=1 × < 6 at separation	0.68 (0.44)	-0.03 (0.36)	0.14 (0.22)	-0.29 (0.47)	0.21 (0.33)	0.19 (0.42)
Other	0.13 (0.56)	-0.07 (0.31)	-0.53*** (0.16)	0.14 (0.26)	-0.94* (0.43)	-0.56 (0.36)
Other=1 × < 6 at separation	-0.38 (0.61)	-0.81† (0.44)	0.34 (0.23)	-0.54 (0.40)	0.37 (0.50)	-0.30 (0.44)
Observations	3395	3395	3395	3395	3395	3395
Nb of Clusters	1453	1453	1453	1453	1453	1453
<i>Panel C : Time with at least One Parent : Engaged Time</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.19† (0.12)	-0.06 (0.10)	-0.13 (0.11)	0.19 (0.12)	-0.26* (0.12)	-0.14 (0.11)
Single Mother=1 × < 6 at separation	0.08 (0.24)	-0.00 (0.17)	0.40* (0.17)	-0.16 (0.17)	0.33* (0.16)	0.20 (0.17)
Single Mother (SP)	-0.40† (0.24)	-0.20 (0.19)	-0.74** (0.27)	-0.16 (0.17)	-0.02 (0.22)	-0.45† (0.23)

Continued on next page

Table 7 – *Continued from previous page*

Single Mother (SP)=1 × < 6 at separation	0.38 (0.32)	0.19 (0.25)	1.18*** (0.33)	0.24 (0.27)	-0.32 (0.28)	0.44 (0.30)
Single Father	-0.57† (0.29)	-0.71* (0.32)	0.15 (0.20)	-0.36 (0.42)	-0.25 (0.26)	-0.70† (0.38)
Single Father=1 × < 6 at separation	0.81† (0.47)	0.38 (0.39)	-0.18 (0.27)	0.61 (0.48)	0.30 (0.34)	0.82† (0.47)
Other	-0.18 (0.28)	0.05 (0.20)	-0.04 (0.14)	-0.09 (0.23)	-0.24† (0.13)	-0.20 (0.21)
Other=1 × < 6 at separation	-0.16 (0.40)	-0.72† (0.37)	0.02 (0.34)	0.24 (0.42)	-0.23 (0.22)	-0.33 (0.34)
Observations	3395	3395	3395	3395	3395	3395
Nb of Clusters	1453	1453	1453	1453	1453	1453

Notes: Individual Fixed-Effect Model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families. Clustered standard errors in parentheses. † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1.

Table 8. Effect of Family Structure on Child and Parental Time Investments; heterogeneity according to Primary Care-Giver's Education

<i>Panel A : Total Time (whoever was present)</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	
Single Mother	-0.09 (0.11)	0.04 (0.10)	-0.09 (0.10)	0.09 (0.10)	-0.00 (0.10)	
Single Mother=1 × More Highly Educated	0.22 (0.15)	0.03 (0.14)	-0.05 (0.16)	-0.04 (0.15)	-0.08 (0.13)	
Single Mother (SP)	0.13 (0.15)	-0.13 (0.14)	0.11 (0.13)	-0.10 (0.15)	-0.05 (0.14)	
Single Mother (SP)=1 × More Highly Educated	-0.20 (0.19)	0.16 (0.21)	-0.01 (0.18)	0.33† (0.18)	-0.25 (0.20)	
Single Father	-0.02 (0.17)	0.10 (0.18)	0.20 (0.21)	-0.18 (0.22)	-0.11 (0.14)	
Single Father=1 × More Highly Educated	-0.09 (0.46)	0.07 (0.34)	-0.04 (0.52)	0.10 (0.40)	-0.12 (0.35)	
Other	0.03 (0.16)	0.24 (0.17)	-0.25 (0.17)	0.10 (0.19)	-0.11 (0.16)	
Other=1 × More Highly Educated	0.01 (0.34)	-0.17 (0.31)	0.54† (0.32)	-0.44 (0.35)	0.09 (0.27)	
Observations	3687	3687	3687	3687	3687	
Nb of Clusters	1522	1522	1522	1522	1522	
<i>Panel B : Time with at least One Parent : Accessible Time</i>						
	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.25* (0.12)	-0.12 (0.09)	-0.21* (0.09)	0.08 (0.10)	-0.04 (0.11)	-0.14 (0.10)

Continued on next page

Table 8 – Continued from previous page

Single Mother=1 × More Highly Educated	0.15 (0.14)	-0.03 (0.16)	0.06 (0.17)	-0.14 (0.15)	-0.16 (0.15)	-0.07 (0.14)
Single Mother (SP)	-0.08 (0.17)	-0.12 (0.17)	-0.19 (0.12)	-0.14 (0.13)	-0.24 (0.15)	-0.28* (0.14)
Single Mother (SP)=1 × More Highly Educated	-0.12 (0.20)	0.03 (0.22)	-0.36† (0.21)	-0.15 (0.17)	-0.39† (0.20)	-0.40* (0.20)
Single Father	-0.40* (0.18)	-0.52* (0.21)	-0.05 (0.19)	0.14 (0.23)	-0.31 (0.19)	-0.38 (0.24)
Single Father=1 × More Highly Educated	0.60 (0.55)	0.09 (0.34)	-0.05 (0.31)	-0.42 (0.45)	0.07 (0.30)	0.01 (0.40)
Other	-0.20 (0.15)	0.03 (0.16)	-0.54*** (0.13)	-0.08 (0.12)	-0.40* (0.18)	-0.43* (0.18)
Other=1 × More Highly Educated	0.40 (0.30)	-0.74* (0.32)	0.34† (0.20)	-0.45 (0.28)	-0.28 (0.29)	-0.38 (0.28)
Observations	3687	3687	3687	3687	3687	3687
Nb of Clusters	1522	1522	1522	1522	1522	1522

Panel C : Time with at least One Parent : Engaged Time

	(House)Work	Personal needs	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.24† (0.13)	-0.05 (0.09)	-0.07 (0.08)	0.06 (0.08)	0.04 (0.10)	-0.08 (0.10)
Single Mother=1 × More Highly Educated	0.16 (0.15)	0.16 (0.13)	0.17 (0.14)	-0.00 (0.14)	-0.09 (0.15)	0.12 (0.15)
Single Mother (SP)	-0.06 (0.15)	-0.02 (0.13)	-0.05 (0.12)	0.10 (0.15)	-0.13 (0.15)	-0.04 (0.15)

Continued on next page

Table 8 – *Continued from previous page*

Single Mother (SP)=1 × More Highly Educated	-0.11 (0.19)	0.01 (0.18)	-0.33 (0.22)	-0.26 (0.18)	-0.24 (0.20)	-0.36† (0.19)
Single Father	-0.40* (0.19)	-0.42† (0.23)	0.06 (0.13)	0.08 (0.27)	-0.08 (0.20)	-0.28 (0.27)
Single Father=1 × More Highly Educated	0.75 (0.59)	-0.11 (0.37)	-0.37 (0.31)	-0.19 (0.43)	-0.09 (0.37)	0.06 (0.47)
Other	-0.20 (0.13)	0.03 (0.15)	-0.61** (0.20)	0.09 (0.13)	-0.34* (0.15)	-0.30† (0.16)
Other=1 × More Highly Educated	0.15 (0.26)	-0.44 (0.30)	0.60* (0.29)	-0.54* (0.28)	-0.12 (0.19)	-0.29 (0.26)
Observations	3687	3687	3687	3687	3687	3687
Nb of Clusters	1522	1522	1522	1522	1522	1522

Notes: Individual Fixed-Effect Model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families. Average PCG's education is around 13 years, the median is also 13, from 0 to 17 (Top 10%). More highly educated parents completed more than 13 years of education; 45% of children in the sample have a more highly educated PCG. Clustered standard errors in parentheses. † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1.

6 Online Appendix

6.1 Parental time investments before the separation

To see whether the decrease in parental time has begun before the separation, because of reverse causality (assumption iii) or anticipation effect (assumption iv), I focus on parental time in two groups: individuals living throughout the survey with both their parents and individuals changing to a single-mother family. Individuals living for a time in a single-father family or in "other" types of family structure are excluded, since the number of observations is too small in these categories for an effect to be seen. Since behaviors in single-mother families and single-father families differ, grouping all these categories together could also be misleading.

Figure 1 in the Online Appendix shows the results of a time-event study, using an individual fixed-effect analysis. These figures show the evolution of parental investments before and after the separation. Before the separation, the amount of parental investments are similar in both family types. This is less clear for time spent with fathers, but the effect is small and not statistically significant.

Results do not suggest that the separation is caused by less available parental time, i.e., reverse causality does not seem to be an issue. Therefore, assumption iii) is reasonable. Nor do results suggest the existence of anticipation effects; the decrease in parental time has not started before separation, so assumption iv) also holds.

6.2 Attrition analysis

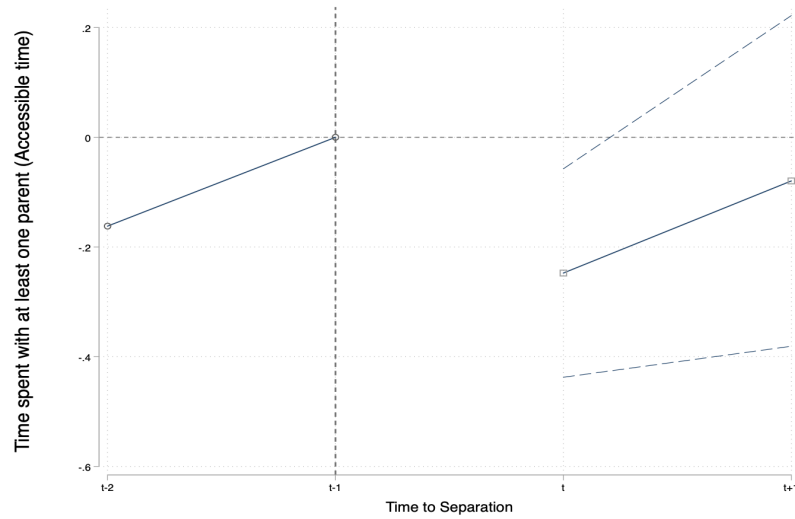
Table 1 in the Online Appendix shows the number of observations in each wave and when these leave the sample. The balanced panel includes 643 children. No Attrition (A_123) means that the child was observed in all three waves. A_ij means that the child was present in waves i and j.

Table 2 in the Online Appendix reports the summary statistics; where individuals were observed over more than one wave, first wave observations are used. Children observed in all the waves are younger and are more likely to have a primary care-giver who is a housewife ; their primary care-giver is also slightly more educated on average. Table 3 in the Online Appendix shows how attrition is explained, using logit regressions. Results are in odds ratio. The probability of leaving the sample is higher when the child is older, especially for attrition on the third wave. Family structure explains attrition in the second wave.

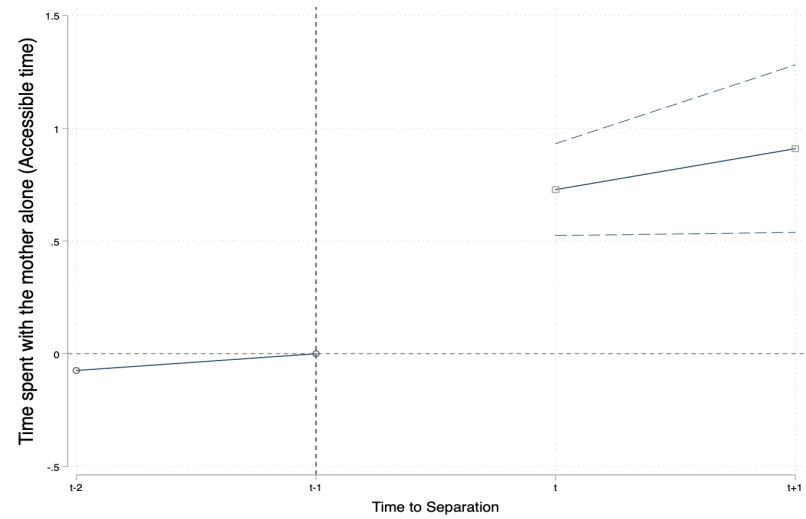
Attrition is difficult to address in this case because it is explained by time-varying variables, and

there is no information on how these variables change in the second wave. For example, children who are living with their single mother in the first wave may leave the sample for this reason or because the mother has met someone and moved in with him. An Inverse Probability Weighting cannot be used here, because attrition is explained mainly by time-varying variables. Also, looking at age, attrition could be explained by year of birth, but it would be irrelevant to over-weight individuals who are older than the panel's age limit (19); moreover, attrition occurs naturally for all individuals over 19. To see whether attrition affects the results, the model is run on the balanced sample. Results are very similar for the balanced panel. Some coefficients are no longer significant because precision is reduced by the smaller sample, but the magnitude is of the same order. Results are shown in Table 4 in the Online Appendix.

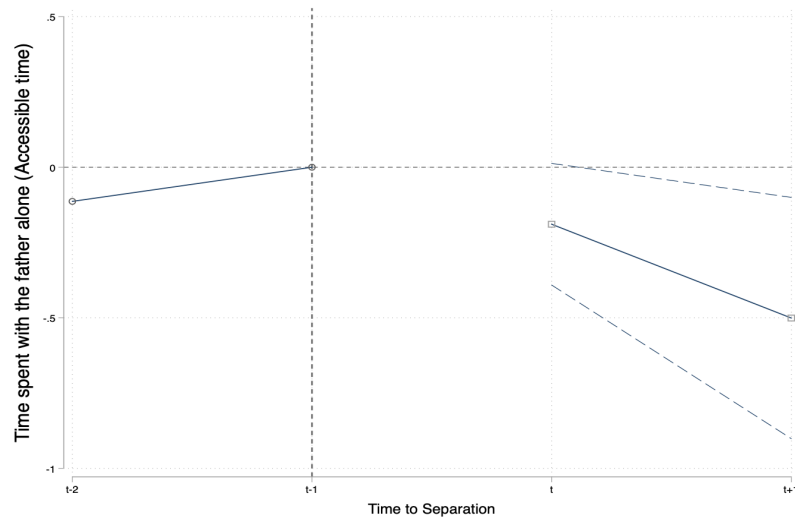
6.3 Additional Figures



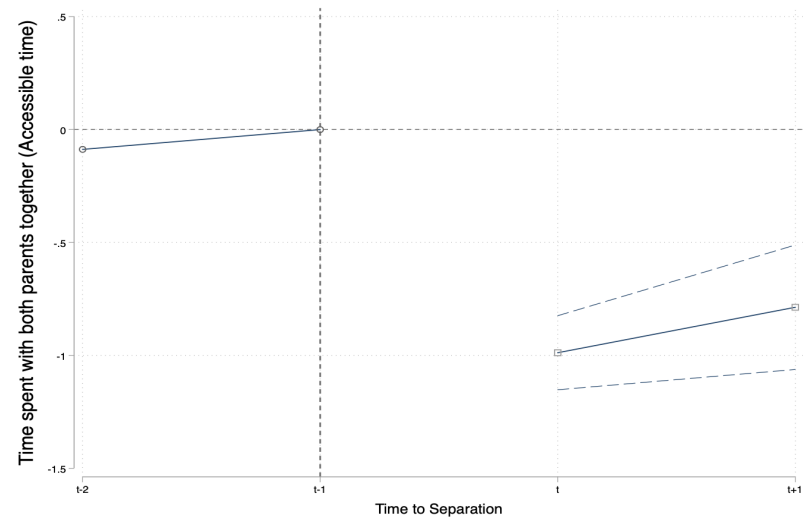
(a) Time spent with at least one parent



(b) Time spent with the mother

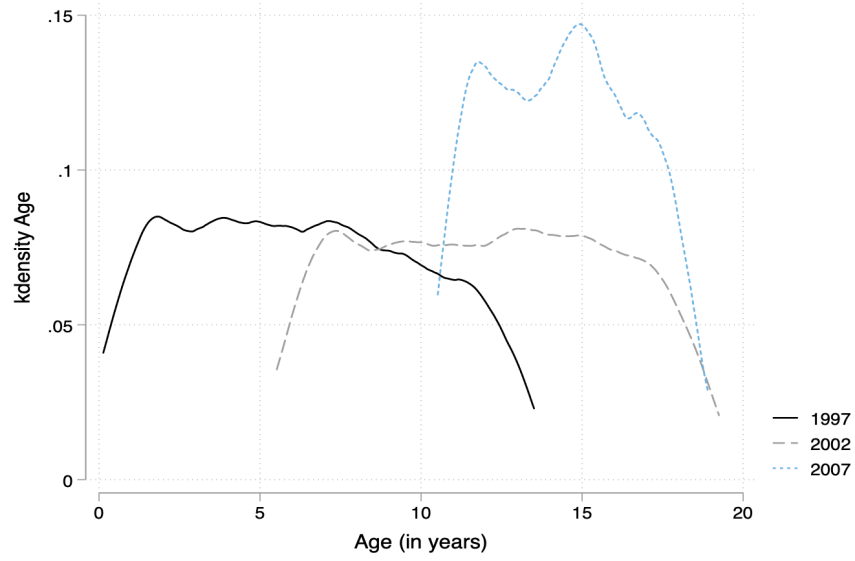


(c) Time spent with the father



(d) Time spent with both parents

Online Appendix - Fig. 1 Parental investments before and after the separation. *Notes:* Results of a time-event study, using an individual fixed-effect analysis. These figures show the evolution of parental investments before and after the separation in single-mother families.



Online Appendix - Fig. 2 Age distribution for each wave

Online Appendix - Table 1. Attrition across waves in our sample

	wave		
	1997	2002	2007
A_123	643	643	643
A_12	729	729	
A_13	136		136
A_23		14	14
Total	1508	1386	793

Notes: This Table shows the number of observations in each wave and when these leave the sample. A_ij indicates that the child is surveyed in wave *i* and *j*; for example, A_123 indicates that the child is surveyed in the three waves.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section [3.1.1](#).

Online Appendix - Table 2. Attrition : Descriptive statistics

	No Attrition	All attrition	A_12	A_13	A_23
	mean	mean	mean	mean	mean
Age	3.94	8.11	8.74	4.14	7.63
Female	0.51	0.52	0.53	0.48	0.71
White	0.75	0.73	0.72	0.77	0.92
African american	0.07	0.08	0.08	0.09	0.08
Hispanic	0.13	0.13	0.14	0.10	0.00
Asian Pacific	0.02	0.02	0.02	0.03	0.00
American Indian	0.00	0.00	0.00	0.00	0.00
Other	0.03	0.03	0.04	0.01	0.00
Two Parents	0.90	0.89	0.89	0.87	1.00
Single Mother	0.08	0.07	0.07	0.07	0.00
Single Mother (step-parent)	0.01	0.02	0.02	0.02	0.00
Single Father	0.00	0.01	0.01	0.02	0.00
Other	0.00	0.02	0.01	0.02	0.00
PCG - Worker	0.60	0.67	0.66	0.74	0.74
PCG - Looking for work	0.03	0.05	0.05	0.07	0.00
PCG - Housewife	0.34	0.26	0.27	0.17	0.26
PCG - Student	0.03	0.02	0.02	0.01	0.00
PCG - Other	0.00	0.00	0.00	0.01	0.00
PCG Education	13.33	12.98	12.94	13.23	14.11
Earnings	14118.31	14402.27	14038.69	16701.31	13990.42
Observations	643	865	729	136	14

Notes: Attrition is a dummy equal to 1 if the child leaves the sample at any wave (A_12 and A_13). A_12 means that the child left the sample in the third wave; A_13 that the child was observed only in the first and the third waves; and A_23 that the child was observed only in the second and the third waves.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1. Where individuals were observed over more than one wave, first wave observations are used.

Online Appendix - Table 3. Attrition - Logit regression

	(1) Attrition	(2) A_12	(3) A_13
main			
Age	1.721*** (0.0518)	1.703*** (0.0540)	1.023 (0.0540)
Female	0.982 (0.195)	1.010 (0.172)	0.871 (0.209)
White	0.745 (0.289)	0.324* (0.181)	2.493 (2.532)
African american	0.565 (0.284)	0.372 (0.229)	2.198 (2.319)
Hispanic	0.695 (0.343)	0.494 (0.315)	1.362 (1.499)
Asian Pacific	1.901 (1.701)	0.564 (0.527)	7.392 (9.655)
Two Parents	0.164* (0.127)	0.201** (0.123)	0.161* (0.147)
Single Mother	0.125* (0.103)	0.251* (0.168)	0.115* (0.112)
Single Mother (step-parent)	0.286 (0.282)	0.133** (0.0904)	0.228 (0.294)
Single Father	1.499 (1.580)	0.411 (0.386)	1.736 (2.316)
PCG - Worker	0.611 (0.699)	2.022 (1.313)	0.579 (0.706)
PCG - Looking for work	1.154 (1.408)	2.409 (1.999)	1.235 (1.581)
PCG - Housewife	0.354 (0.407)	2.235 (1.483)	0.219 (0.266)
PCG - Student	0.327 (0.394)	6.488* (5.136)	0.127 (0.175)
PCG Education	0.963 (0.0444)	1.003 (0.0400)	0.925 (0.0533)
Earnings	1.000 (0.00000748)	1.000 (0.00000293)	1.000 (0.00000957)
Observations	1522	1372	779
Pseudo R^2	0.577	0.377	0.055

Notes: Logit regressions (Odd ratio). Attrition is a dummy equal to 1 if the child leaves the sample at any wave. A_12 means that the child left the sample in the third wave; A_13 that the child was observed only in the first and the third waves. Clustered standard errors in parentheses. † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1. Where individuals were observed over more than one wave, first wave observations are used.

Online Appendix - Table 4. Effect of Family Structure on Time Allocation (Balanced Panel)

<i>Panel A : Total Time (whoever was present)</i>						
	(House)Work	Personal needs and care	Education	Active Leisure	Passive Leisure	
Single Mother	-0.04 (0.12)	0.12 (0.12)	-0.17 (0.11)	0.05 (0.11)	0.01 (0.11)	
Single Mother (step-parent)	-0.01 (0.17)	0.12 (0.17)	0.12 (0.15)	-0.03 (0.18)	-0.26† (0.14)	
Single Father	-0.21 (0.22)	0.29 (0.20)	0.23 (0.25)	-0.06 (0.24)	-0.37* (0.18)	
Other	-0.10 (0.18)	0.18 (0.21)	-0.13 (0.20)	0.04 (0.27)	-0.10 (0.21)	
Observations	1929	1929	1929	1929	1929	
Nb of Clusters	643	643	643	643	643	
<i>Panel B : Time with at least One Parent : Accessible Time</i>						
	(House)Work	Personal needs and care	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.25† (0.13)	-0.11 (0.09)	-0.21† (0.11)	-0.05 (0.11)	-0.09 (0.12)	-0.21† (0.11)
Single Mother (step-parent)	-0.20 (0.19)	-0.06 (0.16)	-0.29† (0.15)	-0.25 (0.16)	-0.25 (0.16)	-0.38* (0.16)
Single Father	-0.26 (0.27)	-0.15 (0.16)	0.09 (0.22)	-0.02 (0.29)	-0.28 (0.22)	-0.28 (0.24)
Other	-0.26 (0.18)	-0.15 (0.19)	-0.56*** (0.14)	-0.39* (0.18)	-0.50* (0.23)	-0.69*** (0.19)
Observations	1929	1929	1929	1929	1929	1929
Nb of Clusters	643	643	643	643	643	643

Continued on next page

<i>Panel C : Time with at least One Parent : Engaged Time</i>						
	(House)Work	Personal needs and care	Education	Active Leisure	Passive Leisure	All
Single Mother	-0.27* (0.12)	0.08 (0.09)	0.01 (0.09)	-0.09 (0.10)	-0.06 (0.09)	-0.13 (0.10)
Single Mother (step-parent)	-0.13 (0.16)	0.19 (0.14)	0.06 (0.15)	-0.00 (0.18)	-0.16 (0.15)	-0.02 (0.15)
Single Father	-0.16 (0.29)	-0.06 (0.17)	0.08 (0.12)	0.07 (0.23)	0.06 (0.23)	-0.01 (0.20)
Other	-0.31* (0.16)	0.08 (0.17)	-0.18 (0.15)	0.00 (0.24)	-0.43* (0.18)	-0.34† (0.19)
Observations	1929	1929	1929	1929	1929	1929
Nb of Clusters	643	643	643	643	643	643

Notes: Individual Fixed-Effect Model. Time variables are standardized to a mean of zero and a standard deviation of one. Controls for age, number of siblings, primary care-giver's working status and earnings are included, along with a dummy indicating a deceased parent. We must note that there are too few transitions for single-father families and "other" types of families (see Table 4) to allow conclusions to be drawn. These results only provide some insight on the effect of parental separation on time investments in these two latter types of families. Clustered standard errors in parentheses. † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Estimation sample drawn from the PSID-CDS, waves 1997, 2002 and 2007, see section 3.1.1. Balanced panel.