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Short- and Medium-term Effects of Parental Separation on Children's Well-being. Evidence from Uruguay

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Resumen

La investigación cuantitativa disponible sobre los efectos de las separaciones y divorcios sobre el bienestar de los niños y el del involucramiento paterno, proviene principalmente de países desarrollados. En base en tres olas de un estudio longitudinal que sigue a una cohorte de niños uruguayos de 6 a 19 años, estudiamos los efectos a corto y mediano plazo de la separación parental sobre el bienestar de los niños considerando la asistencia escolar, la repetición escolar, los años de escolaridad alcanzados, la situación socioemocional, tiempo dedicado a un amplio conjunto de actividades y su situación laboral. Realizamos una estimación de efectos fijos comparando hijos de parejas casadas o que cohabitaban y permanecieron juntas versus un grupo similar que se separó después de 2004. Encontramos evidencia de que la disolución de uniones empeora los resultados educativos de los niños a corto y medio plazo. Mientras tanto, a los 19 años, el bienestar socioemocional, la participación en la fuerza laboral y las horas trabajadas permanecen sin cambios. Aunque los efectos por género y momento del divorcio (niñez o adolescencia) son similares a corto plazo, a los 19 años los resultados educativos de las niñas casi no se ven afectados. No encontramos diferencias robustas asociadas a las transferencias y el contacto con los padres no corresidentes. También exploramos un conjunto de posibles moderadores, como los ingresos familiares, el empleo materno, el acceso a bienes duraderos y las transferencias públicas, que sugieren que los resultados educativos peores están estrechamente relacionados con las dificultades económicas posteriores a la separación.

Palabras clave: separaciones y divorcio; transferencias de padres no corresidentes; educación; bienestar socioemocional; Uruguay; datos longitudinales

Códigos JEL: J12, J13, I30

Abstract

There is limited quantitative research on the effect of parental union dissolution on children's well-being in developing countries. Based on three waves of a longitudinal study that follows up a cohort of Uruguayan children from age 6 to 19, we study the short- and medium-term effects of parental separation on school attendance, grade repetition, completed years of schooling, socio-emotional status, time devoted to a wide set of activities, and labour force participation. We carry out a fixed effect estimation comparing children from married or cohabiting couples that remained together versus a similar group that split after 2004. We find evidence that union dissolution worsens child educational outcomes in the short and medium term. Meanwhile, at age 19, socio-emotional well-being, labour force participation and worked hours remain unchanged. Although effects by gender and timing of the divorce (childhood or adolescence) are similar in the short term, at age 19 girls' educational outcomes are almost unaffected. We do not find robust differences related to child support payments and contact with co-resident fathers. We also explore a set of potential moderators, such as household income, maternal employment, access to durable goods and public transfers, which suggest that worsened educational outcomes are closely connected to post-separation economic hardship.

Keywords: union dissolution; child support; education; socio-emotional well-being; Uruguay; panel data

JEL Classification: J12, J13, I30

1. Introduction

In spite of their long-lasting effects on the quality of life of children and mothers, scarce quantitative studies assess the consequences of couple separation and post-divorce non-co-resident fathers' involvement in developing countries. Little is known on the short-, medium- and long-term effects of union dissolution on children's educational and socio-emotional outcomes and the potentially outweighing role of fathers' involvement in terms of contact and child support payments. This article provides evidence for Uruguay based on three waves of a longitudinal study that follows up a cohort of first-graders at public primary schools in 2004.

It is widely acknowledged that educational achievements and socio-emotional well-being during childhood and adolescence are heavily shaped by the intergenerational transmission of disadvantage (Bowles, Gintis, and Osborne, 2001; Engle et al., 2011), and strongly determine later outcomes in adulthood and overall inequality. Thus, in developing countries there is an ongoing policy debate on the role of cash transfer programmes and a wide set of interventions affecting early childhood development and human capital accumulation. However, there is limited quantitative evidence on the role of family change and gender roles on these outcomes and on how the potential effects of increased enforcement on child support payments can contribute to reducing these disparities.

The existing evidence for developed countries concludes that economic instability and other factors surrounding parental divorce can affect child academic and socio-emotional outcomes, at least in the short term (Amato and Gilbreth, 1999; Amato, Kane, and James, 2011; McLanahan, Tach, and Schneider, 2013; Mooney, Oliver, and Smith, 2009). Many studies conclude that custodial parents (in most cases mothers) and their households experience increased economic hardship, particularly in the short term (Cuesta and Meyer, 2014; Holden and Smock, 1991; Jenkins, 2008; Kiernan and Hobcraft, 1997). However, the final outcomes might vary depending on the dimension of interest and the timing of divorce (McLanahan et al., 2013). In turn, post-divorce regulations, as well as the generosity and outreach of the public transfers system, can also contribute to outweighing these inequalities (Burkhauser et al. 1991; Uunk, 2004).

Available studies for Chile and Mexico suggest that parental separation worsens early child development and increases the risk of anaemia in children aged 3 to 12 (Reynolds, Fernald, Dearnorff, Behrman, 2018; Schmeer, 2013). At the same time, Cuesta and Meyer (2014) and Cuesta (2014) show that in Colombia, child support payments to poor households significantly contribute to poverty, extreme poverty and food insecurity reduction.

Being the first Latin American country to pass a divorce law (1907), Uruguay is a very appropriate context to assess this topic. Divorce increased slowly until the 1970s, when it rose steadily, particularly in the 1980s, making couple

separation a widespread phenomenon (Cabella, 1998; Cabella, Fernández, and Prieto, 2015). Regarding transfers from fathers who do not cohabit with their children, previous studies suggest that, in 2001 and 2007, only around 50% complied with child support payments and had weekly contact with their children (Bucheli, Cabella and Vigorito 2005; Bucheli and Vigorito, 2015).

The twenty-first-century debate led to the implementation of policy measures aimed at strengthening the enforcement of child support obligations, such as the creation of a register of debtors with potential sanctions for non-compliers, and a fathers' job-tracking procedure to deal with hidden income. To date, these interventions have not been evaluated, but the available information from household surveys questions their effectiveness. According to the Uruguayan Household Survey (*Encuesta Continua de Hogares*, ECH), around 56% of fathers of children aged 19 or less did not comply with child support payments in 2015–2017. Meanwhile, contact arrangements received scarce attention, and there is no information available in ECH.

Previous research for Uruguay finds that separation during childhood entails a 16% per capita household income and wealth loss for custodial parents' households, and substantially increases their likelihood of being monetary-poor (Bucheli and Vigorito, 2015; Bucheli and Vigorito, 2019). In turn, Cid and Stokes (2013) find substantial effects of couple dissolution on teenage school attainment among boys. However, the available studies only assess school attendance and do not explore potential moderators such as child support payments and contacts.

This research is based on information provided by three waves of a longitudinal study, *Estudio Longitudinal del Bienestar en Uruguay* (ELBU), which followed a sample of children since they were first-graders at public schools in 2004 until they were around 19 years old in 2017. We analyse the impact of separation, understood as an overarching expression for married couples' divorce, non-legal separation, and separation of couples living together without marriage. Our empirical strategy is based on a difference in difference fixed-effects estimation. Following Oster (2019), we carry out a set of falsification tests to assess the robustness of our results.

We study a wide set of outcomes including school attendance, grade repetition, completed years of schooling, *socio-emotional well-being* (based on the Strengths and Difficulties Questionnaire, SDQ, developed by Goodman and Goodman, 2009), time spent studying and leisure activities, and labour force participation and hours worked at age 19. We also explore heterogeneous effects by timing of separation (childhood or teenagerhood) and child gender. Additionally, we study potential channels that may explain separation effects such as parental involvement (child support payments and contact), household and maternal income, public transfer reciprocity and access to durable goods.

Compared to households with cohabiting parents, union dissolution worsens child educational outcomes and some related time use domains, whereas socio-

emotional well-being remains unchanged. Drop-out rates are not affected at primary school age, whereas the likelihood of repetition increases (13%) and average years of schooling slightly fall (0.25 years). Meanwhile, in adolescence, attendance rates fall (15%) and the average years of schooling gap widens. In addition, results in adolescence hold despite the timing of divorce but educational outcomes are almost unaffected in the case of girls. Finally, it is noteworthy that less than 50% of non-co-resident fathers comply with child support payments and have frequent contact with their children. Although our estimations indicate that paternal involvement partially mitigates the adverse effects of separation, our robustness checks rule out this effect to be exogenous.

Our research contributes to the existing literature in three main avenues. To our knowledge, this is the first paper that provides longitudinal evidence on separation effects on children and teenagers for a developing country, examining a wide set of outcomes and moderators. Effects are concentrated on educational outcomes and related time use domains, whereas socio-emotional and labour outcomes remain unchanged. Since lower educational attainment is difficult to reverse, these effects can result in reduced earnings during adulthood and can contribute to the intergenerational transmission of disadvantage. Secondly, effects on educational outcomes are mainly observed in adolescence, despite the timing of separation, and economic hardship is a relevant moderator underlying these worsened results. Finally, differently to the literature for developing countries, we identify substantial gender differentials regarding medium-term educational outcomes.

The remainder of this paper is organized as follows. Section 2 presents a brief literature review and summarizes the Uruguayan divorce and separation regulations. Section 3 contains methodological details and provides a description of the database and variables used in this study. The main results are discussed in section 4 and section 5 gathers some final comments.

2. Background

2.1 The effects of separation on child outcomes

In their comprehensive literature review of studies that control for endogeneity and omitted variables bias in divorce in developing countries, McLanahan et al. (2013) conclude that parental separation negatively affects school attainment and high school graduation, whereas test scores remain unaffected. The authors argue that cognitive abilities are more unlikely to be affected than non-cognitive abilities and attendance involves the two. However, a recent study by Tartari (2015) for the United States, finds that children from parents that remain together perform three times better in standardized tests than those that experienced parental divorce.

With regard to socio-emotional problems among children and adolescents, McLanahan et al. (2013) indicate that 19 out of 27 studies identify effects on

externalizing behaviour and delinquency. There is also mixed evidence concerning internalizing behaviour, depression and self-esteem.

Post-divorce worsened outcomes have been linked to a wide scope of factors, among which economic hardship has a key role (Amato and Gilbreth, 1999; Cuesta and Cancian, 2015; Cuesta and Meyer, 2014; Holden and Smock, 1991; Jenkins, 2008; Kiernan and Hobcraft, 1997). In their meta-analysis, Amato and Gilbreth (1999) find a positive association between parental transfers and child academic achievements or lack of internalizing problems. They also find that authoritative parenting is the most robust predictor of child outcomes, whereas frequency of contact and visits is questioned. Specifically, closeness has a positive effect on children's educational achievements.

Ten years after, a new systematic review by Mooney et al. (2009) confirm previous conclusions regarding financial hardship after family breakdown. However, they strengthen the role of mediators such as parental conflict, parenting styles and maternal mental health on a broad set of dimensions of child well-being.

A group of studies concludes that joint custody and frequent contact with non-resident fathers have a positive or negligible effect on children, depending on the outcome (Amato, 2000; Amato, 2010; Rasmussen and Stratton, 2016). However, a study for Norway finds a negative relationship between non-cohabiting fathers' proximity and long-term outcomes in educational and economic outcomes in young adulthood of the children, with the driving force being exposure to parental conflict (Kalil, Mogstad, Rege, and Votruba, 2011).

Recent studies also highlight the relevance of pre-divorce conditions in post-divorce outcomes. Furthermore, a literature review by Amato (2010) emphasizes that this a key element to explaining heterogeneity in post-divorce outcomes, although he acknowledges that pre-divorce conflict studies indicate low or little conflict before divorce, making it difficult to identify anticipation indicators or events. Based on a fixed-effects estimation strategy, Leturcq and Panico (2018) find that although there is a significant increase in financial stress and monetary poverty after couple separation, divorced parents in the United Kingdom tend to protect the pre-divorce living standards of the child. They also identify substantial heterogeneity in these findings, depending on pre-divorce conditions.

It is noteworthy that these studies do not find clear patterns by gender of the child.

Available studies exploring the effects of separation and parental transfers on child well-being in Latin America identify a negative correlation between children's schooling and single-parent or extended households (see, for example, Arriagada, 2006; Chant, 2015; Cuesta, Ríos-Salas, and Meyer, 2017; Kaztman, 1991; Kaztman and Filgueira, 199; Liu, Esteve, and Treviño, 2016). However, most of these studies lack an identification strategy to control for potential selectivity.

In the case of Chile, Buvinic, Valenzuela, González, and Molina (1991) find a negative effect of divorce/separation on the nutritional status of children, school

attendance and grade repetition, based on a small sample of teenage mothers that delivered their children at a public hospital. A recent article by Reynolds et al. (2018) provides new evidence for Chile, relying on lagged variables estimations and first differences. Based on a two-wave longitudinal study (*Estudio Longitudinal de Primera Infancia*) for children aged 0 to 5 in the first wave and 2 to 7 in a follow-up round, they find null or scarce effects of parental separation on vocabulary skills (as of Peabody Picture Vocabulary Test) and behaviour scores (as of Child Behaviour Check List). They also show that father's exit entails a per capita income loss of 15%. The authors suggest that maternal employment, social subsidies and child support contribute to outweigh the income loss, although they are not able to directly assess these moderators.

Previous research for Uruguay based on two waves of ELBU and *Encuesta de Situaciones Familiares*, and a combined propensity score matching-difference in difference identification strategy suggest that for custodial mothers and children, separation entails a significant per capita household income and wealth loss and increases monetary poverty (Bucheli and Vigorito, 2015, 2019). The income fall is partially mitigated by child support, public transfers, and changes in living arrangements and behavioural labour market responses from mothers, with a 79% rise in their labour earnings. Thus, the final net per capita household income fall is around 16% (Bucheli and Vigorito, 2019).

Based on cross-sectional data from the 2006 official household survey that collected retrospective information on divorce/separation, Cid and Stokes (2013) carry out an instrumental variables estimation (using neighbourhood divorce rates as instrument) on school attendance for children aged 9 to 16. They conclude that boys whose parents experienced a couple split before compulsory school age present a larger probability of dropping-out from high-school compared to those living with their biological parents, whereas no effects are found among girls.

In sum, previous quantitative studies for developing countries are scarce and have not assessed either whether the timing of divorce affects child well-being and whether these effects hold later, or the role of parental involvement.

2.2. Separation regulations and family allowances in Uruguay

According to the Uruguayan laws and regulations, parents must provide financial support to their children, despite their marital status. After divorce or separation, parents may make a private agreement on child support, custody and a visitation schedule that might be ratified in court. If parents do not reach an agreement, a family judge will fix child support obligations and a visitation regime as part of the divorce proceedings. Even in the case of non-married couples, non-compliance with child support or impediments to access to children constitute grounds for legal action.

The scarce child support obligations enforcement became salient in the public debate at the beginning of this century, when, for the first time, estimates based on survey data were available and shown that 58% of fathers did not comply with their payments (Bucheli et al., 2005). The existing sanctions, such as the inclusion in a Child Support Debtor Registry, the seizure of the offender's assets that leads to auctioning, and travel bans for offenders, did not warrant compliance.

To date, there is scarce research on non-compliance. A qualitative study based on interviews by Bucheli et al. (2005), reveals that judges report a general feeling of gloom about the economic capacity of offenders, which in most cases are poor, the overall socio-economic family situations and a tendency of offenders to conceal their income. In this context, as the system is based on filing a child support lawsuit, it is reasonable that these private actions tend to be abandoned if the offender persists in evading his obligations. However, two recent legal modifications may have a positive effect of enforcement. In the first place, at present parents must make a sworn statement of income, which is subject to sanctions. Second, the court communicates the social security system father's obligations, which in turn notifies the employer, who withholds the child support payment and directly transfers it to the custodial parent.¹ However, until 2020 there was *scarce public discussion* on contact arrangements. At present, three new proposals on joint custody regulations have been submitted to the Parliament.

With regard to family allowances, vulnerable households with children aged 0 to 18 are eligible to receive child allowances in their contributory or non-contributory strand (*Asignaciones Familiares* and *Plan de Equidad*, respectively). For children aged 5 or more, the programme is conditional on school attendance. Because of the means test, eligibility might increase after family breakdown. In fact, Bucheli and Vigorito (2019) conclude that public transfers contribute to mitigating the income loss after separation to a similar extent as child support payments.

3. Data and methods

3.1 Data

¹ More detail can be found at: <https://www.bps.gub.uy/15876/registro-nacional-de-obligados-alimentarios.html>

This study is based on microdata from the *Estudio Longitudinal del Bienestar en Uruguay* (ELBU).² ELBU follows a representative sample of households with children that were attending the first year of primary school at public institutions in Montevideo and urban areas in 2004. The sample was drawn from the 2002 Third National Height Census.

Around 87% of the Uruguayan population lives in urban areas and 85% of these children attended public schools in that year. Thus, our analysis is representative of the cohort, although the richest income strata is under-represented.

To date, ELBU comprises four waves. Since wave 2 (2006) only covered the capital city (Montevideo). This study is based on waves 1 (2004), 3 (2011/12) and 4 (2017/18). In the first wave, 3200 households were interviewed. Panel attrition is 44% and there are no substantial biases in the loss in terms of socio-economic characteristics, although the probability of finding elderly household heads and households outside of Montevideo was slightly higher (Failache, Salas and Vigorito, 2018).³

Our analysis is restricted to the subset of children whose parents were married or cohabited in 2004. We consider that a couple split between 2004 and 2011/12 or 2017/18 if the interviewee (mothers in most cases) declared that the child's parents did not live together in the corresponding wave. Among this group of households, we discard those cases in which children were not living with their mother in waves 1 and 3, or the father died.

A total of 810 couples met our selection criteria. 13.7% separated between 2004 and 2011/12 and 18.2% between 2004 and 2017/18 (Table 1).

3.2 Main variables

In this section we provide a brief description of the variables used in this study. More details can be found in Table A1. The effect of interest is captured by a binary variable that is 1 if the reference child's parents separated after wave 2004 and 0 otherwise. Short-term effects are captured by comparing waves 2004 and 2011/12, whereas medium-term effects are based on waves 1 and 4 and divorce timing interactions.⁴

Educational outcomes include school attendance, grade repetition and completed years of schooling. The evolution of these outcomes was different in the two groups

² More information can be found at <http://www.fcea.edu.uy/estudio-del-bienestar-multidimensional-en-uruguay.html>

³ We do not include the estimations in this paper due to space constraints, but they are available on request to the authors.

⁴ Unfortunately, the survey does not gather information on the year of the couple's separation, so we are not able to control for time since separation. Hence, the observed effects between 2004 and 2011/12 might be an average of short-term and medium-term outcomes.

of interest (Table 1). In wave 3, attendance rates were 93% among children living with both parents, and 90% among those that experienced parental separation. Meanwhile, in wave 4, these figures respectively fell to 61% and 48%. Completed years of formal education were 7.1 and 6.9 in wave 3, and 10.0 and 9.3 in wave 4, respectively. Grade repetition rates were 24.9% and 38.5% in wave 3 and rose to 40 y 54% in the last wave. Since work is permitted for youngsters aged 15 years or more, only wave 4 collected data on children's labour status and worked hours. Children from separated couples exhibit higher labour participation and are more likely to be out of labour market and school than children whose parents were living together in wave 4.

Table 1. Descriptive statistics

Variable	Wave 1	Wave 3		Wave 4	
	All	Parents still living together	Separated parents	Parents still living together	Separated parents
Marital status (%)	100.0	86.3	13.7	81.1	18.9
Children characteristics					
Age (average)	6.3	13.6	13.6	18.1	18.0
Attendance rate (%)	100.0	93.3	90.0	61.3	48.5
Grade repetition (%)	0.0	24.9	38.5	40.0	53.7
Years of schooling (average)	0.0	7.1	6.9	10.0	9.3
Labour participation (%)				52.0	59.4
Out of school and work				6.0	9.4
SDQ score		10.8	13.1	10.0	11.0
Time spent by children in ...					
Reading	2.2	2.9	2.1	n.a.	
Sports	1.5	2.2	1.4		
Computer	2.2	10.0	9.5		
Study out of school	0.3	3.8	3.0		
TV	13.9	10.9	9.3		
Father's involvement					
Child support payments (%)			52.7		28.6
Contact with non-co-res. father (%)			47.1		34.3
Maternal outcomes					
Labour force participation	0.57	0.66	0.85	0.69	0.75
Hours worked	19.1	25.0	31.2	21.1	26.1
Earnings (logs)	4.8	6.3	6.9	7.4	8.5
Custodial parent's household					
Public transfers (logs, UY\$ per month)	0.4	0.04	2.5	0.3	1.5
Per capita household income (logs, UY\$ per month)	7.8	8.4	8.0	8.7	8.4
Monetary poverty (%)	0.76	0.50	0.68	0.34	0.52
Durable goods index	7.6	8.3	9.0	7.94	8.7

Source: authors elaboration based on ELBU.

We also consider a set of outcomes not included in the three waves. In waves 1 and 3 the survey questionnaire gathered information on time spent by children in a wide set of activities, including reading, practising sports, using a computer, studying outside school, and watching TV. In waves 3 and 4, the survey provides information about children's socio-emotional status (as of SDQ) reported by mothers.

Additionally, to study non-co-resident father's involvement we assess child support payments and contact. The survey inquires whether fathers deliver child support payments in four categories: regularly; occasionally; not now but in the past; never did. We build a dummy variable that is equal to 1 when the answer is regularly and 0 otherwise. Contact with non-co-resident fathers are captured in these options: regularly; occasionally; not now but in the past; never did. We build a dummy variable equal to 1 when payments are regularly done and 0 otherwise.

In 2011/12, 47% of separated mothers declared their children to have frequent contact with their fathers and 53% received child support. In 2017/18, these figures were 34% and 29%. Interestingly, in the last wave, reference children were around 19 years old and were also interviewed. According to their reports, their fathers' compliance with child support obligations was 36%, whereas 47.8% had regular contact with their fathers. Since they are available in the last two waves, in our estimations we stick to maternal reports. However, results are similar when using youngster reports.

Among potential moderators we include per capita household income, poverty status, maternal labour earnings and worked hours, child allowances received by the custodial mother and a durable goods index.

3.3 Empirical strategy

Since separations are not randomly distributed among couples, direct comparisons between children from cohabiting versus separated parents might be biased (Amato and Previti, 2003; Frisco, Muller, and Frank, 2007; Sigle-Rushton and McLanahan, 2004). Using ELBU waves 1 and 3, Bucheli and Vigorito (2019) conclude that more educated women, teenage mothers and those who declare higher social participation levels are more likely to separate, whereas more religious women and those who are married (compared to those cohabiting) present a lower likelihood.

To mitigate the potential reverse causality and omitted variables bias, in this paper we resort to a difference in difference and fixed-effects identification strategy and carry out a set of robustness checks to validate our results.

A child i might face two potential outcomes: Y_{0i} if her parents remain cohabiting (0) and Y_{1i} if they separate (1). To control for potential unobserved heterogeneity, we estimate a fixed-effects linear probability model:

$$Y_{it} = \alpha + \beta D_{it} + \varphi X_{it} + \eta_i + \varepsilon_{it} \quad (1)$$

where Y is the outcome of interest, X is a set of time-variant covariates, η are child fixed effects and D is a binary variable indicating separation. Coefficient β captures the potential effect of union dissolution on the outcome of interest. The subscript t is the ELBU wave.

For each outcome of interest and moderator, we carry out a separate estimation assessing short-term effects (waves 1 and 3) and medium-term effects (waves 1 and 4). We return to this point later in this section.

To identify heterogeneous effects by gender, separation timing and paternal involvement (contact with non-co-resident parents and child support provision), we include interactive terms multiplying D by the corresponding dummy variable (I). We estimate and report the base coefficient (β) and the interaction term (θ):

$$Y_{it} = \alpha + \beta D_{it} + \theta D_{it} I_{it} + \varphi X_{it} + \eta_i + \varepsilon_{it} \quad (2)$$

For the fixed-effects estimator to be interpreted correctly, the error term must be uncorrelated with the variables in the equation. Although individual fixed effects can remove time-invariant unobservable characteristics, if couple dissolution generates time-varying changes in unobservable variables, the fixed-effects estimator will be biased.

Robustness checks

Since we were not able to identify an adequate instrumental variable in the data set, we carried out two sets of robustness checks. We first run placebo estimations for the full set of regressions for waves 1 and 4, and 3 and 4, regressing pre-separation outcomes. In the divorce literature, this strategy can also be interpreted as an anticipation effects test. Secondly, we implement the methodology proposed by Altonji, Elder, and Taber (2005) and Oster (2019) to assess how omitted variables and selectivity might affect our results.

The latter technique relies on quantifying the ratio of selection on unobservables to observables (δ) needed to attribute the entire effect of separation (β) on the outcome of interest to selection bias. We first run a baseline regression that includes only the separation variable as a regressor and then a second one, including the full set of available covariates (v). This procedure allows us to assess the magnitude and direction of β after including (v).

For instance, if δ is equal to 2, unobservables should be twice as relevant as observables to cause $\beta = 0$. Altonji et al. (2005) suggest that $\delta=1$ would be an appropriate cut-off. The sign of δ indicates the direction of the correlation among observables and unobservables. This procedure is based on the idea that the full set of unobservables and observables would yield an R-squared (R-max) equal to 1.

However, as argued by Oster (2019), $R_{\max}=1$ may lead to an overadjustment and $R_{\max}=1.5R$ (where R is the R-squared of the estimation on observables) would be an appropriate minimum for R_{\max} . In this paper we present our results for $R_{\max}=1.5R$ and 1. We refer to these tests as Altonji, Elder, Taber–Oster (AETO).

4. Main results

We present the estimated effects of separation on child well-being (4.1) and analyse moderators reflecting whether separation entails increased economic hardship (4.2). Finally, we assess the role of parental involvement in offsetting separation difference effects in our outcomes of interest (4.3).

4.1 Separation and children’s outcomes

Table 2 contains the estimated effects of separation on children’s education-related outcomes. Column (1) exhibits short-term effects when the child was at primary school age or in the first years of high school and separation (waves 1 and 3). The remaining columns compare waves 1 and 4. In Column (2) we report the average effect of separation whenever this event took place (ages 6 to 19/20). Columns (3) and (4) report heterogeneous effects, respectively identifying separation in childhood (6/7 to 12/13, base category) and adolescence (more than 12/13 to 19/20, interactive term). The number of cases and R^2 are reported in Table A2.

Estimates in Column (1) suggest that, at primary school age, education-related effects of separation are scarce. The lack of effect on school attendance might be related to the universal coverage of primary schooling and the first years of middle school in Uruguay. Meanwhile, the estimated coefficient of grade repetition is positive and statistically significant, suggesting a 13% increase relative to children living with both parents. Although the AETO test reported in Table 3 rejects exogeneity (assuming $R_{\max}=1$), δ increases to 0.7 for 1.5^*R^2 . Consistently, the effect on years of schooling is also negative, though low (0.2 years on average) but robust to the AETO test.

The estimates reported in Column (3) suggest that in the medium term (at age 19), children whose parents separated in their childhood completed around one schooling year less than children of cohabiting parents. This worsened outcome is similar to the one obtained when separation took place in adolescence. However, the magnitude of the interactive term is positive, indicating that the effect worsens in the medium term, which is consistent with the cumulative nature of educational outcomes and, specifically, years of schooling (Column 4). Thus, despite the timing of divorce, educational effects are noticeable in teenagerhood, and the short-term/medium-term distinction is blurred in this case. These results are different

from those obtained by McLanahan et al. (2013) indicating that divorce affects child outcomes to a larger extent during early childhood than teenagerhood.

Attendance and grade repetition effects reported in Columns 3 and 4 are in line with the previous comments. Attendance rates experience a 15% fall relative to the control group, and the timing of divorce does not entail significant differences. It is hard to capture grade repetition effects in adolescence because high school students in Uruguay can approve the different subjects independently. Repetition turns into a vague notion, consistently with the imprecision we get in the corresponding coefficient. Thus, completed years of schooling are the best indicator of educational achievement in wave 4.

Table 2. Estimated effects of separation on children's education-related outcomes (robust standard errors in parentheses). Fixed-effects estimation

Outcomes	Age 6/7 to 12/13 (waves 1 and 3)	Ages 6/7 to 19/20 (waves 1 and 4)		
		Average Effect	Timing ^{a/}	
			Separation in childhood (base category)	Separation in adolescence (interaction term)
	(1)	(2)	(3)	(4)
School attendance (yes=1)	-0.0349 (0.0285)	-0.150 (0.0458)***	-0.145 (0.0572)**	-0.0140 (0.0843)
Grade repetition (1=yes)	0.130 (0.0485)***	0.0834 (0.0457)*	0.0964 (0.0568)*	-0.0321 (0.0838)
Years of schooling	-0.225 (0.0964)**	-0.834 (0.199)***	-0.939 (0.236)***	0.282 (0.366)
<i>δ for β=0 and Rmax=1</i>				
School attendance (yes=1)	n.a	0.185	0.104	n.a
Grade repetition (1=yes)	0.137	0.122	0.088	
Years of schooling	-1.201	-1.245	-0.965	n.a
<i>δ for β=0 and Rmax= 1.5R²</i>				
Attend school (yes=1)		0.500	0.279	n.a
Grade repetition (1=yes)	0.743	0.248	0.324	n.a

Notes:

*** p<0.01, ** p<0.05, * p<0.1

^{a/} Wald test of (joint) separation and interactive term (Columns 3 and 4): attend school p= 0.005; Grade repetition p= 0.176; Years of schooling p= 0.000.

Table 3 depicts heterogeneous effects by gender (Number of observations and R² can be found in Table A3) The low number of cases does not allow to open results for separations in child's adolescence. Interaction term captures additional effects for girls.

Boys whose parents separate in childhood are more likely to repeat and have less years of schooling at age 12/13 (Column 1). At age 19/20, they are less likely to attend school and their cumulative loss is above one year. In the short term we do not find significant gender differences (Column 4).

However, even imprecise, in the medium term, educational outcomes from girls are less likely to be affected than boys (Column 5 and 6). School attendance interaction terms almost outweigh the worsened impacts observed for boys, indicating that the post-separation school evolution in girls is very close to individuals that did not experience family breakdown. Regarding completed years of schooling, girls also present a handicap compared to individuals whose parents still live together, but the effect approximately halves that of boys.

AETO tests indicate that only the effect on years of schooling is robust, particularly at age 19/20.

Table 3. Estimated effect of separation on education-related outcomes. Heterogeneous effects by gender (robust standard errors in parentheses). Fixed-effects estimation

Outcomes	Separation (base category)			Interaction term (girl=1)		
	At age 12/13 (waves 1 and 3)	At age 19/20 (waves 1 and 4)	Separation in childhood	At age 12/13 (waves 1 and 3)	At age 19/20 (waves 1 and 4)	Separation in childhood
	(1)	(2)	(3)	(4)	(5)	(6)
School attendance	-0.0486 (0.0424)	-0.303 (0.0602)***	-0.284 (0.0755)***	0.0264 (0.0548)	0.283 (0.0794)***	0.270 (0.104)***
Fa/	0.81	12.73***	7.09***			
Grade repetition	0.172 (0.0708)**	0.0745 (0.0640)	0.0942 (0.0792)	-0.0785 (0.0921)	0.0164 (0.0825)	0.00421 (0.106)
Fa/	3.88**	1.68	1.44			
Years of schooling	-0.342 (0.147)**	-1.352 (0.267)***	-1.324 (0.318)***	0.220 (0.177)	0.940 (0.341)***	0.736 (0.423)*
Fa/	3.07**	13.25***	9.83***			
<i>δ for β=0 and Rmax=1</i>						
School attendance	n.a	0.196	0.220	n.a	-0.172	-0.179
Grade repetition	0.079	n.a	n.a	n.a	n.a	n.a
Years of schooling	-0.925	-1.026	-1.130	n.a	0.856	0.730
<i>for β=0 and Rmax=1.5R²</i>						
School attendance	n.a	0.503	0.574	n.a	-0.450	-0.471
Grade repetition	0.425	n.a	n.a	n.a	n.a	n.a

*** p<0.01, ** p<0.05, * p<0.1

a/ Joint Wald test (base separation coefficient and interaction term coefficient): *** p<0.01, ** p<0.05, * p<0.1.

Regarding other activities undertaken by the child, separation apparently reduces time devoted to studying and playing sports by approximately one hour per week (Table 4). The former is consistent with worsened educational outcomes, whereas the latter might reflect a pure income effect. Compared to children with cohabiting parents in wave 3, these effects entail a halved to one-third reduction in time allocated to these activities. However, AETO tests reveal that only time devoted to sports yields a robust result.

The heterogeneous effects estimation highlights a 30% increased time in exposure to screens among girls compared to the average of children cohabiting with both parents. Since δ is positive, this effect is robust to the AETO test.⁵

Table 4. Estimated effect of separation on children's spent time on several activities (robust standard errors in parentheses). Average and heterogeneous effects by gender

Outcome	Age 12/13 (waves 1 and 3)		
	Average effect	Heterogeneous effects by gender (girl=1)	
		Separation (base category)	Interaction term
Time spent reading	-0.987 (0.648)	-0.00358 (0.944)	-0.983 (1.104)
F ^{a/}		1.16	
Time spent playing sports	-1.335 (0.544)**	-1.273 (0.992)	-0.116 (1.079)
F ^{a/}		4.59**	
Time spent in front of a computer	0.977 (1.226)	-1.604 (1.621)	4.768 (2.257)**
F ^{a/}		2.40*	
Time spent studying out of school	-1.123 (0.515)**	-0.939 (0.480)*	-0.355 (0.951)
F ^{a/}		2.86*	
Time spent watching TV	0.755 (1.501)	-1.379 (1.565)	3.874 (2.680)
F ^{a/}		1.06	
δ for $\beta=0$ and $R_{max}=1$ ($R_{max}=1.5R^2$)			
Time spent reading			
Time spent playing sports	-0.031 (-2.610)		
Time spent in front of a computer			0.125 (0.465)
Time spent studying	-0.148 (-0.565)	-0.078 (-0.299)	
Time spent watching tv			

*** p<0.01, ** p<0.05, * p<0.1

a/ Joint Wald test (base separation coefficient and interaction term coefficient): *** p<0.01, ** p<0.05, * p<0.1.

As mentioned above, waves 3 and 4 included the SDQ instrument reported by mothers. We computed the global score and the five subscales: emotional symptoms; conduct problems; hyperactivity/inattention; problems with peers; and

⁵ Since the estimated effect of separation in an uncontrolled regression is higher than the (negative) estimated effect when other controls are included, positive δ is enough to reject the null hypothesis. Thus, separation is positively correlated to time spent in front of a computer. If unobservables are positively correlated with time spent in front of a computer, omitted unobservables would further increase the separation effect.

prosocial behaviour. Scores increase in all components with problems severity, except for prosocial behaviour.

As wave 1 lacks SDQ, fixed-effects estimation could only be implemented resorting to waves 3 and 4, leaving aside the subset of couples that split between waves 1 and 3 (Table 5). A relevant weakness in these estimations is the low number of couples that separated between waves 3 and 4. To assess these findings, in the first two columns we also include a cross-sectional estimation for each wave. At age 12/13, total problems and peer problems are affected by separation. At age 19/20 peer problems related to separation (whenever it took place) persist, but the effect on global SDQ vanishes. In fixed-effects estimates (last column), there is only an imprecise effect in peer problems with a reverted sign, suggesting that overall problems remain unchanged and slightly lowered difficulties (5%) in relations with peers compared to children living in two parents' households. In sum, the socio-emotional status of children remains unchanged after parental divorce. Results are robust to the AETO test.

Table 5. Estimated effect of separation on children's Strength and Difficulties Questionnaire (SDQ) score reported by mothers (robust standard errors in parentheses). Fixed-effects estimates

Outcome	Cross-section		Panel
	Age 12/13 (wave 3)	Age 19/20 (wave 4)	Age 19/20 (waves 3 and 4)
SDQ Total score	1.935 (0.712)***	0.563 (0.874)	-0.468 (0.744)
SDQ- Emotional symptoms	0.440 (0.262)	0.309 (0.353)	0.0219 (0.297)
SDQ-Conduct problems	0.587 (0.210)	0.248 (0.257)	-0.0969 (0.204)
SDQ-Hyperactivity/inattention	0.458 (0.243)	-0.241 (0.294)	-0.0549 (0.257)
SDQ- Peer problems	0.646 (0.216)***	0.631 (0.300)**	-0.412 (0.237)*
SDQ- Prosocial behaviour	-0.318 (0.224)	-0.514 (0.367)	-0.106 (0.289)
<hr/>			
SDQ total score			
δ for $\beta=0$ and $R_{max}=1$	-0.2662		
δ for $\beta=0$ and $R_{max}=1.5^*R$	-11.09		
SDQ- Peer problems			
δ for $\beta=0$ and $R_{max}=1$	-0.0127	-0.2527	0.0059
δ for $\beta=0$ and $R_{max}=1.5^*R$	-13.3	-17.7	1.1

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ for a test testing the null hypothesis that the estimated parameter is null.

Finally, we assess child labour outcomes in wave 4, at age 19/20. As in the case of SDQ, we report two estimations using alternatively a cross-sectional estimation

and a fixed-effects one restricted to couples that lived together in wave 3 (Table 6). Apparently, parental separation has no effect on the likelihood of working or in the number worked hours. However, children whose parents separate are more prone to report not studying and working is imprecise. Unfortunately, we are not able to assess labour force attachment at ages 15–17, where economic hardship can make an important difference. Secondly, unemployment rates at age 20 are considerably high in Uruguay and, at the same time, children from richer households might still be full-time students.

Table 6. Estimated effect of separation on children’s employment-related outcomes at age 19/20 (robust standard errors in parentheses). Cross-section and fixed-effects estimation. Waves 3 and 4

Outcomes	Wave 4	Fixed-effects estimation Waves 3 and 4
Employment (yes=1)	0.0655 (0.0675)	0.0668 (0.0681)
Working hours per week	-0.613 (1.841)	-0.618 (1.945)
Do not work and do not attend school (yes=1)	0.0306 (0.0375)	0.0237 (0.0464)

*** p<0.01, ** p<0.05, * p<0.1

To provide an additional check of the robustness of our results, we carried out cross-sectional placebo estimations for all available outcomes in wave 1 (Table A4). Additionally, for the subset of children whose parents divorced in adolescence, we replicated our fixed-effects instrumental variables estimation considering pre-divorce outcomes. Specific outcomes such as school attendance in wave 1 (by construction all children were first-graders) or labour force status before wave 3, cannot be tested.

Our robustness checks indicate a lack of effects before separation. In a difference-in-difference context, this might be suggesting that the parallel trends assumption holds. At the same time, in the divorce/separation literature, this might be interpreted as the lack of observable anticipation effects, as suggested by Amato (2010). Under the two hypotheses, our previous analysis is validated.

4.2 Separation, maternal labour force attachment and economic hardship

Post-separation economic hardship might moderate worsened educational outcomes. To dig deeper into this potential explanation, we assess the effects of separation on maternal labour force attachment, labour earnings and household income, public transfers reciprocity and a durable goods index (Table 7).

Separated women exhibit higher labour force participation rates than married/cohabiting ones (Table 1). Although selectivity into divorce is associated with higher previous labour force participation, family breakdown entails a 21% increase in paid work among women when children were at school age.

At the same time, intensive margin is also affected, and separation implies an average 7 additional hours worked per week, which represents 60% compared to the control group baseline data. This is consistent with increased labour earnings among separated mothers. These effects vanish when assessing waves 1 and 4, despite the timing of separation. Many hypotheses that have been raised and tested in the previous literature can be consistent with this result: married women might adjust their hours worked when their children are young and then might tend to move to full-time jobs, whereas divorced and separated women, due to income constraints, complete these transitions earlier (see, for example, Espino, Isabella, Leites, and Machado, 2017; McLanahan et al., 2013).

Increased maternal income and access to child allowances cannot overcome the per capita household income loss caused by divorce. Again, this fall mainly occurs during childhood and it is not outweighed in the long term (39% versus 33%). However, when parental separation occurs in a child's teenagerhood, the income loss is considerably lower (approximately 3%), and the average income loss comparing waves 1 and 4 is only 7%. This finding differs from the literature for developed countries. In the United Kingdom, Jenkins (2009) identifies a short-term income loss of around 16% that vanishes in the long term.

Table 7. Estimated effects of separation on maternal and household outcomes (robust standard errors in parentheses). Fixed-effects estimation

Wave	Maternal outcomes			Public transfers	Per capita household income	Monetary poverty	Durable goods index
	Labour force part.	Hours worked	Earnings				
Waves 1 and 3							
Average effect							
Coefficient	0.216	7.568	0.995	1.817	-0.391	0.184	-0.832
Standard error	(0.0542)***	(2.548)***	(0.407)**	(0.218)***	(0.154)**	(0.0508)***	(0.130)***
N	872	872	872	872	872	872	831
Waves 1 and 4							
Average effect							
Coefficient	0.0417	2.701	0.576	0.828	-0.0738	0.186	-0.880
Standard error	(0.0499)	(2.513)	(0.429)	(0.243)***	(0.143)	(0.0504)***	(0.127)***
N	872	872	872	872	872	872	831
Waves 1 and 4							
Separation timing							
Base category (childhood)							
Coefficient	0.0197	3.756	0.507	0.0359	-0.332	0.147	-0.990
Standard error	(0.0622)	(3.126)	(0.535)	(0.298)	(0.178)*	(0.0620)***	(0.156)***
Interaction (adolescence)							
Coefficient	0.0742	1.137	0.677	1.997	0.306	-0.0907	-0.705
Standard error	(0.0740)	(3.730)	(0.636)	(0.355)***	(0.211)	(0.0754)	(0.192)***

*** p<0.01, ** p<0.05, * p<0.1

The significant increase in monetary poverty incidence, suggests that the income loss is heavily concentrated among deprived households, probably reflecting the limited labour earnings generation capacity of less-educated women. The effect on poverty is persistent, and again, milder for couples separating during their offspring's adolescence. In line with Panico and Leturq and Panico (2017), these findings suggest again that divorce/couple separation effects are heterogeneous.

Finally, access to durable goods exhibits an almost 12% reduction compared to the baseline control group average value. All results presented in this section are robust according to the AETO tests for $R_{max} = 1.5 * R$ (Table A5).

4.3 Father's involvement

To analyse heterogeneous effects regarding fathers' involvement, we consider whether there is frequent contact between fathers and children and whether fathers comply with child support payments. The number of observations and R^2 of the estimations are reported in Table A6.

In 4.1 we have shown that in the short term, parents' separation in childhood is associated with a slight increase in grade repetition and a reduction in attained

years of schooling. The estimated signs are similar when introducing the interactive term of the two proxies of paternal involvement (Table 8). Involvement seems to partially reverse the worsened education-related outcomes. However, results are not robust to the AETO test.

At age 19/20, we get negative effects on school attendance with interaction term coefficients very close to zero. The estimation suggests that child support outweighs the worsening of outcomes. Again, these results are not supported by the AETO tests. Only in the case of years of schooling are these tests close to the recommended δ threshold.

Table 8. Estimated effects of separation on children's education-related outcomes by frequency of contact with father and child support (robust standard errors in parentheses)

Outcomes	At age 12/13 (waves 1 and 3)				At age 19/20 (waves 1 and 4)			
	Contact		Child support		Contact		Child support	
	Separation (base category)	Interaction term (contact=1)	Separation (base category)	Interaction term (child support=1)	Separation (base category)	Interaction term (contact=1)	Separation (base category)	Interaction term (child support=1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
School attendance	-0.0352 (0.0385)	0.000742 (0.0546)	-0.0280 (0.0390)	-0.0134 (0.0544)	-0.180 (0.0523)***	0.105 (0.0922)	-0.190 (0.0511)***	0.160 (0.0953)*
F ^{a/}	0.75		0.77		6.10***		6.90***	
Grade repetition	0.167 (0.0659)**	-0.0797 (0.0914)	0.205 (0.0696)***	-0.146 (0.0910)	0.0371 (0.0528)	0.165 (0.0879)*	0.0861 (0.0514)*	-0.0111 (0.0957)
F ^{a/}	3.89**		4.63***		3.66**		1.67	
Years of schooling	-0.123 (0.135)	-0.219 (0.173)	-0.253 (0.119)**	0.0540 (0.175)	-0.797 (0.224)***	-0.126 (0.401)	-0.832 (0.217)***	-0.00686 (0.430)
F ^{a/}	4.17**		3.01**		8.74***		8.85***	
<i>δ for β=0 and Rmax=1</i>								
School attendance	n.a	n.a	n.a	n.a	0.164	n.a	0.185	-0.161
Grade repetition	0.090	n.a	0.105	n.a	n.a	0.200	0.098	n.a
Years of schooling	-0.381	n.a	-0.713	n.a	-0.917	n.a	-0.986	n.a
<i>δ for β=0 and Rmax=1.5 R²</i>								
School attendance	n.a	n.a	n.a	n.a	0.441	n.a	0.495	-0.437
Grade repetition	0.484	n.a	0.558	n.a	n.a	0.401	0.198	n.a

Note: the interactive term is the product of separation and frequent contact or child support.

*** p<0.01, ** p<0.05, * p<0.1

^{a/}Wald test of (joint) separation and interactive term: *** p<0.01, ** p<0.05, * p<0.1

5. Final comments

Based on a three-wave longitudinal study, ELBU, we assessed the effect of parental separation on a broad set of child outcomes. We also analysed the variation in these results regarding separation timing and presence of paternal involvement or child support payments.

Our findings indicate that when separation occurs at school age, there are no effects in school attendance at age 12/13. However, we also find that parental separation yields a lower time devoted to studying and playing sports. In the medium term, we find a negative effect in completed years of schooling and an increased probability of not attending school and not working. These effects might arise during adolescence or might result from differences already originated in childhood, as suggested by our findings regarding time use. Unfortunately, we lack outcomes in early childhood referring to learning capacity and results in test scores.

Although we do not find significant differences by child's gender in the short term (at ages 12/13), at ages 19/20 educational outcomes are worsened in boys to a larger extent, whereas girls almost catch up with children from cohabiting couples.

Regarding socio-emotional well-being (as of SDQ), our estimations for teenagerhood suggest that separation does not entail modifications in general, and there is only an imprecise effect of reduced problems with peers at age 19/20 that needs to be further studied.

In line with previous studies, we identify that for custodial mothers' households, separation implies increased economic hardship, particularly when family breakdown occurs during childhood. Public transfers play a relevant role mitigating economic hardship.

At the same time, fathers' involvement outweighs some of the worsened education and time use outcomes already described but these aspects need to be further studied since many of our results lack robustness.

Regarding validation of the inclusion of survey questions on parental involvement, one interesting feature of this study comes from the fact that in wave 4, mothers and offspring were interviewed and separately reported child support payments and contact with non- co-resident fathers. Although mothers tend to under-report in both cases, the estimated results do not vary.

To conclude, it is worth pointing out that, particularly between waves 1 and 3, like most Latin American countries, Uruguay experienced outstanding economic growth rates that fostered unskilled workers employment and was coupled with a wide package of redistributive interventions, such as the expansion of non-contributory cash transfer schemes. More research is needed to assess how these results vary in a context of economic slowdown.

Finally, more research is needed to assess whether the results identified in this paper hold when separation occurs in early childhood. At the same time, further ELBU waves will allow the in depth assessment of the consequences of parental separation on other domains of the transition to adulthood, such as fertility and marriage/cohabitation patterns. Furthermore, another important aspect to assess refers to the long-term effects of separation in work characteristics and earnings profiles.

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Appendix

Table A1. Variables description

Variables	Description
<i>Separation and paternal involvement</i>	
Separation	A couple is considered to be separated if its members were not living together in 2011/12 or 2017/18, respectively. We computed three dummy variables: D1=1 if couple split occurred in wave 2011/12 and 0 otherwise; D2 if couple split occurred in wave 2017/18 and 0 otherwise; D3=1 if couple split occurred in wave 2011/12 or 2017/18 and 0 otherwise. By definition, all observations are equal to 0 in 2004.
Child support	Each questionnaire gathers information on whether non-cohabiting parents make child support payments and their frequency. In each wave, we built a variable that takes a value of 1 if the non-cohabiting father complies with child support payments in the corresponding wave (regardless of frequency), and 0 otherwise. Alternative variables were created for 2017/2018 based on children reports (not used in estimations)
Contact with non-co-resident fathers	Each questionnaire gathers information on frequency of contacts with non-co-resident fathers. For each wave, we built a variable =1 if children have frequent contact with their parents and 0 otherwise. Alternative variables were created for 2017/2018 based on children reports (not used in estimations)
<i>Household well-being</i>	
Household income (per capita)	In both waves all household members' monthly income is collected by source (labour earnings, pensions, capital income, public transfers (mainly family allowances and food transfers), other income (including private transfers) and estimated housing rent). Household income is the sum of all these variables; the final dependent variable is household income deflated by the Consumer Price Index and expressed in logarithms and per capita.
Assets index	For each wave we created a composite durable goods index based on the methodology proposed by Filmer and Pritchett (2000). The list of goods and weights is presented in Table A2.
Income poverty	Poverty is defined according to the national threshold (INE, 2007). The variable takes a value of 1 when households are below the national poverty threshold and 0 otherwise.
Public transfers (per capita)	Reported public transfers (mainly comprised of family allowances and food transfers) are deflated by the Consumer Price Index and expressed in logarithms and per capita.
<i>Maternal outcomes</i>	
Autonomous income	Mother's income (excluding estimated housing rent, public and private transfers), deflated by the Consumer Price Index and expressed in logarithms.
Labour income	Mother's labour income deflated by the Consumer Price Index and expressed in logarithms.
Maternal employment	It takes a value of 1 when the mother is employed and 0 otherwise.
Hours worked	Mother's hours worked in all jobs in the week before the interview expressed in logarithms; it takes a value of 0 when she reports no work.

Variables	Description
Hourly wage	Mother's labour income per hour deflated by the Consumer Price Index and expressed in logarithms.
<i>Children outcomes</i>	
School attendance	It takes a value of 1 when the child attends school and 0 otherwise.
Grade repetition	Dummy variable that takes a value of 1 when the child repeated at least once in the corresponding wave and 0 otherwise.
Time spent reading	Hours spent reading in the week before the interview expressed in logarithms. In 2004 it also includes time spent listening to stories read out loud.
Time spent playing sports	Hours spent playing sports in the week before the interview expressed in logarithms.
Time spent using a computer	Hours spent using a computer in the week before the interview expressed in logarithms. It includes time devoted to play in 2004 and devoted to play and study in 2011/12.
Time spent studying outside the classroom	Hours spent studying outside the classroom in the week before the interview expressed in logarithms. In 2004 it also includes time spent listening to stories read out loud. It is comprised of time allocated to study and to extracurricular activities, except computation studies and sports. In 2011/12 it explicitly includes homework.
Time spent watching TV	Hours spent watching TV in the week before the interview expressed in logarithms.
<i>Other covariates</i>	
Age	Age of the mother/child in years.
Sex	Sex of the child

Table A2. Estimation of the effect of separation on children’s education-related outcomes: Number of observations and R²

Outcomes	Age 12/13 (waves 1 and 3)	Age 19/20 (waves 1 and 4)	
		Average effect	With timing
	(1)	(2)	(3)
N			
Attend school (yes=1)	1,744	1,642	1,642
Grade repetition (1=yes)	1,730	1,642	1,642
Years of schooling	1,706	1,583	1,583
R ²			
Attend school (yes=1)	0.071	0.421	0.421
Grade repetition (1=yes)	0.264	0.496	0.496
Years of schooling	0.977	0.950	0.950

Table A3. Estimation of the effect of separation on education-related outcomes for boys and girls: Number of observations and R²

Outcomes	Age 12/13 (waves 1 and 3)	Age 19/20 (waves 1 and 4)	
		Average effect	With timing
	(1)	(2)	(3)
N			
Attend school (yes=1)	1,744	1,642	1,642
Grade repetition (1=yes)	1,730	1,642	1,642
Years of schooling	1,706	1,583	1,583
R ²			
Attend school (yes=1)	0.072	0.430	0.430
Grade repetition (1=yes)	0.265	0.496	0.496
Years of schooling	0.977	0.950	0.951

Table A4. Estimation of the effect of separation on children's spent time in several activities:
Number of observations and R²

Outcome	All	With interactive girl term
N		
Time spent reading	1608	1608
Time spent playing sports	1712	1712
Time spent in front of a computer	1671	1671
Time spent studying	1727	1727
Time spent watching tv	1608	1608
R ²		
Time spent reading	0,012	0,013
Time spent playing sports	0,017	0,017
Time spent in front of a computer	0,343	0,347
Time spent studying	0,341	0,341
Time spent watching tv	0,055	0,058

Table A5. Robustness checks. Estimated effect of separation on the outcomes of interest before separation (robust standard errors in parentheses)

Outcome	Cross-section estimation (wave 3)	Panel data estimation
School attendance	-0.0103 (0.126)	-0.00204 (0.0325)
Years of schooling	-0.0103 (0.126)	0.0482 (0.109)
Grade repetition	0.0641 (0.217)	-0.0933 (0.237)
SDQ-Total symptoms	-0.003 (0.125)	
SDQ- Emotional symptoms	-0.0261 (0.958)	
SDQ-Conduct problems	-0.0183 (0.288)	
SDQ-Hyperactivity/inattention	-0.110 (0.215)	
SDQ- Peer problems	-0.0272 (0.329)	
SDQ-Prosocial behaviour	-0.461 (0.658)	
Time spent reading <i>N(1)=1482</i>	0.0182 (0.581)	0.00813 (0.295)
Time spent playing sports <i>N(1)=163480</i>	-0.621 (0.411)	0.0170 (0.405)
Time spent exposed to a computer <i>N(1)=1604</i>	-1.189 (1.165)	-0.0261 (0.958)
Time spent studying <i>N(1)=1710</i>	-0.341 (0.641)	-0.110 (0.215)
Time spent watching tv <i>N(1)=1476</i>	-0.191 (2.537)	0.0683 (0.233)

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ for a test testing the null hypothesis that the estimated parameter is null.

Table A6. Robustness checks AETO tests.

Wave and indicator	Maternal outcomes			Public transfers	Per capita household income	Monetary poverty	Durable goods index
	Labour force part.	Hours worked	Earnings				
Waves 1 and 3 δ for $\beta=0$ and $R_{max}=1$	0.047	0.053	-0.229	-0.245	-0.085	-0.150	-0.204
δ for $\beta=0$ and $R_{max}=1.5^*R$	1.906	1.868	-0.596	-4.198	-1.710	-2.034	-1.894
Waves 1 and 4 Average							
δ for $\beta=0$ and $R_{max}=1$	0.013	0.007	0.052	0.040	-0.021	-0.207	-0.092
δ for $\beta=0$ and $R_{max}=1.5^*R$	0.395	0.877	0.278	2.233	-0.118	-0.692	-0.869
Waves 1 and 4 Separation timing							
Base category (childhood)							
δ for $\beta=0$ and $R_{max}=1$	0.008	0.012	0.054	-0.038	-0.114	-0.308	-0.191
δ for $\beta=0$ and $R_{max}=1.5^*R$	0.235	1.503	0.291	-1.555	-0.630	-1.018	-1.808
Interaction (adolescence)							
δ for $\beta=0$ and $R_{max}=1.5^*R$	0.029	0.006	0.077	0.096	0.097	-0.112	-0.271
δ for $\beta=0$ and $R_{max}=1.5^*R$	0.858	0.794	0.415	2.234	0.538	-0.378	-2.763

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The findings presented in this section show that households that split in childhood experience significant economic hardship, that persists in higher poverty rates in adolescence. The timing of separation has different consequences on mothers' labour earnings and household income, with a larger loss for those who separate in childhood.

Table A7. Estimation of separation on children's education-related outcomes by frequency of contact with father and child support: Number of observations and R²

	At age 12/13 (waves 1 and 3)		At age 19/20 (waves 1 and 4)	
	Contact	Child support	Contact	Child support
N				
Attend school (yes=1)	1744	1744	1642	1642
Grade repetition (1=yes)	1730	1730	1642	1642
Years of schooling	1706	1706	1583	1583
Time spent reading	1608	1608		
Time spent playing sports	1712	1712		
Time spent in front of a computer	1671	1671		
Time spent studying	1727	1727		
Time spent watching tv	1608	1608		
R²				
Attend school (yes=1)	0,071	0,072	0,422	0,423
Grade repetition (1=yes)	0,265	0,267	0,498	0,496
Years of schooling	0,977	0,977	0,950	0,950
Time spent reading	0,017	0,012		
Time spent playing sports	0,017	0,018		
Time spent in front of a computer	0,344	0,343		
Time spent studying	0,346	0,343		
Time spent watching tv	0,056	0,056		