Documentos de Trabajo

Separation, Child Support and Well-Being in Uruguay

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Abstract

Despite the significant transformations that household formation patterns have experienced in developing countries, there is scarce quantitative research on the effects of union dissolution. This article provides evidence for Uruguay on the impact of family breakdown and child support on a wide set of family outcomes, based on two waves of a longitudinal study that follows up on children that were first graders at public primary schools in 2004. We find that separation entails a significant per capita household income loss and increases deprivation in terms of income poverty and access to durable goods, for custodial mothers and children. The income loss is mitigated but not completely offset by public and private transfers and behavioural responses among mothers, whose labour earnings increase significantly after separation. Union dissolution seems to worsen child educational outcomes, in particular grade repetition. Sensitivity analyses show that these results are robust.

Keywords: divorce, child support, Uruguay, panel data.

JEL: J12, J13, I30

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Resumen

A pesar de los cambios en los patrones de la formación de hogares experimentados en los países en desarrollo, la investigación cuantitativa de los efectos de la disolución de las uniones es escasa. Este artículo brinda evidencia para Uruguay del impacto de la ruptura de la pareja y la pensión alimenticia en un amplio abanico de variables, basándose en dos olas de una encuesta longitudinal que recoge información de alumnos de primer año en las escuelas públicas de 2004. Encontramos que la separación implica para los niños y madres (que tienen la custodia) una pérdida significativa del ingreso per cápita del hogar y aumenta la privación en términos de pobreza monetaria y de acceso a bienes durables. La pérdida de ingreso es mitigada, pero no completamente compensada, por transferencias públicas y privadas, y respuestas de comportamiento de las madres, cuyos ingresos del trabajo crecen después de la separación. La disolución de la unión parece también empeorar los resultados educativos de los niños, en particular en términos de repetición escolar. Análisis de sensibilidad muestras que estos resultados son robustos.

Palabras clave: divorcio, pensiones alimenticias, Uruguay, datos de panel.

Introduction

Over the last three decades, household structures and families have experienced significant transformations worldwide, due to changing patterns in transitions to adulthood, couple formation and separation (Furstenberg, 2010). Many studies uncover a strong association between family arrangements and household members' wellbeing and point out that final outcomes as well as gains and losses arising from family change differ among mothers, children and fathers (Bartfeld, 2000).

Specifically, multidimensional deprivation is higher among households with children and in particular among lone parent nucleus (Kiernan and Smith, 2003). Available studies for developed countries highlight that most consequences from family breakdown mainly occur in the short run, whereas they tend to revert to their previous levels in the medium and long run (Mooney, Oliver and Smith, 2009). At the same time, gender trajectories after divorce are very different, with higher well-being losses among women who also are the custodial parent. In most cases, public transfers and maintenance arrangements do not fully offset post-divorce income losses (Amato and Gilbreth, 1999; Cuesta and Cancian, 2015; Cuesta and Meyer, 2014).

Due to the lack of suitable longitudinal information, there is scarce quantitative evidence for developing countries on the effects of separation and divorce on living standards and related outcomes, and, specifically, on the role of child support payments. In order to contribute to filling this gap, the purpose of this study is to analyse the impact of family breakdown and child support in Uruguay on a wide set of household, maternal and child outcomes. Specifically, our outcomes of interest include household income, poverty, access to durable goods, mother's labour force participation and hours worked, child school attendance, grade repetition and time spent by children in a wide set of leisure activities.

Uruguay is a very interesting case study to assess the future evolution of developing countries and in particular Latin American ones, as the country completed the first demographic transition in the first two decades of the XXth century and has been experiencing significant changes in family arrangements since the 1970s (Filgueira, 1996). The more salient feature of this evolution is cohabitation among young couples, which according to census data, grew from 20% in 1996 to 80% in 2011. At the same time, the

proportion of births out of wedlock was 70% in 2010 (Cabella, Fernández and Prieto, 2015). The most recent information available indicates that 35% of married couples were expected to split up in the subsequent years and that the proportion of children aged 0 to 18 cohabiting with both parents is 60.6%, whereas 35.9% lived with one parent (Cabella, Fernández and Prieto, 2015).

Regarding transfers from fathers who do not cohabit with their children, previous studies report that, in 2001 and 2007, around 58% of fathers do not comply with child support payments (Bucheli and Cabella, 2009; Bucheli and Vigorito, 2015).

Our empirical exercise is based on data from Estudio Longitudinal del Bienestar en Uruguay (ELBU), a longitudinal study carried out by Universidad de la Republica. The sample is representative of children attending the first grade of primary public schools in 2004 in urban areas. Specifically, we use data from the first wave (baseline), when most children were 6 or 7 years old, and from the third wave carried out in 2011/12 (follow-up) in which they were 12 to 13 years old. Of couples living together in 2004, 16% split up between waves. Within this group, only 49% of custodial mothers received child support.

The main challenge for obtaining unbiased estimations of separation and child support effects on the outcomes of interest lies in the fact that the probability of separation and compliance with maintenance arrangements might be correlated with observable and unobservable characteristics of parents (Amato, 2000; Amato and Previti, 2003; Frisco, Muller and Frank, 2007; Sigle-Rushton and McLanahan, 2004). If the more deprived couples are more likely to separate, OLS regression analysis might produce upwards-biased estimations. Following Aasve et al. (2007), our identification strategy is based on propensity score matching methods to obtain comparable treatment (those couples that were no longer cohabiting in the follow-up) and control groups (couples that were still cohabiting in the follow-up). On this basis, we carry out a combined PSM-diff in diff estimation (Heckman, Ichimura and Todd, 1997; Smith and Todd, 2005). However, as biases could still exist due to unobservable heterogeneity and we lack an appropriate instrumental variable, we check the robustness of our results using the methodology proposed by Altonji, Elder and Taber (2005) and Oster (2016).

As ELBU follows children and custodial parents, one important caveat of this study is that it does not provide information on the evolution of the outcomes of interest among non-custodial parents, who are men in most cases. Besides, due to the time span between the

baseline and the follow-up round, the results presented in this study reflect short- and medium-run outcomes.

We find that, for custodial mothers and children, separation entails a significant per capita household income and wealth loss, and it also increases their likelihood of being monetarily poor. However, the fall in income is partially mitigated by child support, public transfers, and changes in living arrangements and behavioural labour market responses that increase mothers' earnings capacity, with a 79% rise in labour earnings. Thus, the final net per capita household income fall is around 16%. Meanwhile, separation worsens child educational outcomes, particularly with respect to grade repetition. However, we find weak evidence that this disadvantage vanishes among those households receiving child support.

The remainder of this article is organized as follows. Section I presents a brief overview of the existing empirical literature on the effects of separation and child support. Section II contains methodological details and provides a description of the database and variables used in this study. The main results are discussed in section III and section IV gathers some final comments.

I. The effects of separation on household, maternal and child outcomes

In what follows we present a brief review of the literature on the effects of separation and divorce related to the outcomes of interest in this study. We first focus on households and adults (i) and children outcomes (ii). After that, we present a short overview of present regulations in Uruguay regarding visits and child support regimes, as well as on access to public transfers directed to children (iii).

i)   Household and maternal outcomes

Potential changes in socio-economic well-being of custodial families after separation arise from losses in economies of scale in expenditure –typically housing costs and other public goods–, family wealth dissolution resulting from the division of commonly owned assets or the loss of an earner. The latter might be higher due to the labour market gender gap, as long as custodial parents are usually mothers and might not see income changes fully countered by his/her cash and in-kind transfers. At the same time, as the happiness literature has highlighted, divorce is one of the main drivers of reductions in life satisfaction (Clark, 2015). Thus, maternal subjective well-being and depression might also

be at play, affecting earnings ability and parenting quality, particularly soon after separation or divorce.

However, potentially varied behavioural responses make it difficult to predict the final result. In order to compensate for the loss in income and other economic resources, mothers might increase their labour supply, both at the extensive and intensive margin. At the same time, they might move to a smaller house or return to their household of origin, becoming a member of some other extended household (Liu, Esteve and Treviño, 2016). Finally, if they remarry or enter into a new union, it remains possible that income losses will not be fully overcome. Such changes might partially or completely outweigh the income losses occurring due to the separation and, hence, the final result is ambiguous.

As mentioned in the introduction, most empirical evidence comes from studies on developed countries, where this topic and family change in general have been at the centre of the public policy debate, and many long-run longitudinal studies are available. Most research concludes that income losses after separation are bigger for women, especially when they become the custodial parent (Mooney, Oliver and Smith, 2009).

Bartfeld (2000) indicates that in the case of the United States, 18 months after divorce, income losses range from 35 to 45% in the case of mothers and children, whereas they are almost negligible in the case of men. Further studies confirm these findings.

In a study on the Netherlands, Manting and Bouman (2006) show that income losses are higher for women than men, and for out-of-wedlock unions than for married couples. As in the Netherlands, labour market participation is low among women with children, and so the consequences of separation are severe and difficult to fully counter.

In their analysis of the United Kingdom, Duncan and Hoffman (1985) find that post-separation income reductions in the case of women are mainly overcome by remarrying rather than by increased work. Apparently, five years after divorce, household income levels among women are similar to before separation. Again, custodial parents present higher losses. Jarvis and Jenkins (1999) find similar results for Great Britain: women in charge of children experience higher income losses after separation than men (77% versus 4%) and public transfers have a modest effect in reducing these differentials.

Regarding the previous point, Burkhauser et al. (1991) and Uunk (2004) find that, among European Union countries, the generosity and coverage of the transfer system can make a

relevant difference on the costs of separation. Specifically, Scandinavian countries do best in compensating for negative impacts on wellbeing. However, receiving welfare might generate an unwanted effect in terms of maternal labour supply.

Another branch of the literature has focused on the role of father's transfers in compensating for these losses. Meyer and Hu (1999) find that, in the United States, parent alimonies and child support reduce poverty among custodial mothers by 7%, amounting to a similar effect to that of public transfers. Bartfeld (2000) finds that fathers' transfers comprise approximately 29% of mothers' income but this is not enough to overcome poverty, and the gap in poverty rates among custodial and non-custodial parents remains substantial (31-38% versus 9-13%). Related studies have also analysed the effect of father's transfers on mother's labour market participation and work. Based on experimental data, Cuesta and Cancian (2015) conclude that receiving child support has no significant effect on maternal labour effort. Fischer (2015) analyses the interplay between maintenance arrangements and public child support for the case of Australia, and finds that policy design reduces eligibility for government transfers among households receiving child support.

Based on an identification strategy that combines propensity score matching and difference-in-difference estimations, Aasve et al. (2007) assess the effects of divorce on a wide set of outcomes and multidimensional well-being measures in several European countries. They conclude that income is more sensitive to separation than multidimensional well-being. At the same time, differences between men and women are huge and significant when considering income, but disappear when analysing non-monetary indicators. Based on the same identification strategy, Ongaro, Mazzuco and Meggiolaro (2009) find very similar results for the Italian case. There is abundant research on the living conditions of female-headed and single parent households compared to other family structures in Latin America: older studies indicate high levels of deprivation (see, for example, Kaztman, 1991; Kaztman and Filgueira, 1999) but recent research challenges this traditional view (Arriagada, 2006; Chant, 2015; Liu, Esteve and Treviño, 2016; Cuesta, Ríos-Salas and Meyer, 2017). However, only four studies carried out for Chile, Colombia and Uruguay, that are summarized in what follows, analyse the effect of separation/divorce on household wellbeing.

Based on a random survey of 324 teenage mothers who delivered their child at Hospital Clinico, Universidad de Chile, and a follow-up survey conducted in 1991, when the children were six years old, Buvinic et al. (1991) find that 61% of non-cohabiting fathers provided child support. Their distinctive characteristics were having been married to the child's mother, being employed and maintaining contact with the child. In addition, they point out that mothers not receiving child support were less educated and worked more hours. They also find that separation precedes labour market participation, and, thus that couple dissolution has a positive effect on teen mothers' labour supply.

Available studies for Colombia analyse the role of child support in overcoming poverty. Cuesta and Meyer (2014) carry out a static simulation and find that support reduces poverty incidence by 32% among custodial mothers.[4] Also based on a static comparison, another study finds that a 10% increase in child support recipiency reduces food insecurity by 9% among custodial mothers in Colombia (Cuesta, 2014).

In the case of Uruguay, based on two waves of the panel of the *Encuesta de Situaciones Familiares*, Bucheli and Vigorito (2015) analysed the effect of separation on crowding, access to durable goods and household income. In line with Aasve et al. (2007) they find a strong negative effect only in the case of income, and this loss is not outweighed by other income sources. However, the authors did not assess the specific role of child support or public transfers.

ii) Child outcomes

The determinants of child outcomes after couple dissolution have been linked to a wide scope of factors. Despite acknowledging that family breakdown might be a difficult situation for children to cope with in the short run, the recent literature available for developed countries puts more weight on the strength of emotional ties, conflict and violence among parents and children, parenting styles and maternal mental health than on family structure *per se* or just compliance with child support payments (Mooney, Oliver and Smith, 2009).

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[4] Poverty incidence is 58% before child support and falls to 53% after receiving the transfer. However, restricting the sample to the group of households that actually receive child support, these figures are 59% and 40%. Based on this evidence, the authors argue that the situation of single parents in Latin America is similar to the one observed in Anglo-Saxon countries, but is much worse than in Scandinavia.

In this vein, Amato and Gilbreth (1999) conduct a meta-analysis on the effect of parental transfers, frequency of contacts and parenting styles on child academic achievements and lack of internalizing problems, based on 63 studies. They find a positive association between parental transfers and their outcomes of interest. Besides considering frequency of contact and visits, they also assess varied dimensions of parenting styles, finding that authoritative parenting is the most robust predictor of child outcomes. Specifically, closeness has a positive effect on children's educational achievements.

Mooney, Oliver and Smith (2009) also review the empirical research assessing the effects of family breakdown on a broader set of dimensions of child well-being including health, alcohol use and problems with relationships. They stress the effect of parental conflict, parenting styles and maternal mental health, on these outcomes, both in intact and non-intact households. In the case of family breakdown, the instability associated with financial hardship and moving is also found to have a negative impact on child outcomes.

A group of studies have focused on the effect on post-divorce/separation arrangements between parents and their effects on child outcomes, finding that joint custody and more frequent contact has a positive or negligible effect, depending on which child outcome is studied (Amato, 2000; Amato, 2011; Rasmussen and Stratton, 2016). However, a study on Norway based on an identification strategy that exploits duration of exposure to different household structures among siblings, finds a negative relationship between non-cohabiting fathers' proximity and long-run outcomes in educational and economic outcomes in young adulthood of the children, with the driving force being exposure to parental conflict (Kalil et al., 2011).

Available studies exploring the effects of separation and parental transfers on child well-being in Latin America point out a negative correlation between children`s schooling and single parent or extended households (Kaztman, 1991). In the Chilean case, Buvinic et al. (1991) find a negative effect of divorce/separation on the nutritional status of children, as well as on grade repetition and school attendance.

However, as in the case of maternal and household outcomes, most studies carried out in the region lack an identification strategy to control for potential selection biases related to family structure.

iii) Maintenance arrangements, visits regimen and child benefits in Uruguay

According to the existing law, when couples divorce or separate, they must agree upon a child support and visits regimen. If an agreement is not reached, the court sets a schedule. Non-compliance with these conditions constitutes grounds for legal action. However, the legal system has little power to enforce agreements and court decisions. In the 2000s, the dissemination of survey data on the extent of non-compliance (58% of fathers failed to make child-support payments) gave rise to public debate about the prevailing legislation governing child support (Bucheli and Cabella, 2009). However, the topic has not been central in the policy agenda.

Regarding public transfers to households with children, Uruguay has significantly expanded the non-contributory portion of the social protection system over the last decade. Households with children aged 0 to 18 are entitled to receive the *Asignaciones Familiares-Plan de Equidad*, which is a cash transfer program targeted to vulnerable populations. Qualifying for the program depends both on an income threshold and a means test based on a linear combination of household characteristics (Amarante and Vigorito, 2012). At present, almost 40% of households with children receive this transfer, which is conditional on school attendance for children over the age of 5. As the first qualifying threshold is a means test based on per capita income, single parent households are more likely to become program beneficiaries.

II. Methodology

i) Empirical strategy

If divorce/separation episodes were randomly distributed among married/cohabiting couples, a direct comparison among those who experienced divorce/separation and those who remained together would yield unbiased estimates of the effects of family dissolution on the outcomes of interest. However, previous work attests that those couples more prone to separate are different across a set of observable and unobservable features, in comparison with those that remain together (Amato, 2003; Frisco, Muller and Frank, 2007; Sigle-Rushton and McLanahan, 2004). For instance, perhaps women who are more economically dependent on their husband are less likely to separate. Thus, biases might arise from differences in observable and unobservable variables between the two groups.

To sort out this problem, drawing on previous work by Heckman, Ichimura and Todd (1997), Aasve et al. (2007) build a comparable baseline sample using propensity score matching (PSM) techniques, and then carry out a difference-in-difference estimation. Essentially, this method compares changes in the situation of both treatment and control groups relative to their observed outcome at a pre-intervention baseline. The method assumes that unobserved heterogeneity does not vary over time, so any potential biases from unobserved heterogeneity cancel each other out when looking at the difference in the change between groups. This is known as the parallel trend assumption, which means that unobserved characteristics that affect union dissolution or child support payments do not vary over time with treatment status.

We follow this strategy to study the effects of separation and child support. In what follows, we develop the methods we use for estimating the effect of divorce or separation (hereafter referred to as "separation"), but the reasoning is analogous for child support recipiency.

In this setting, an individual i might face two potential outcomes: Y_{0i} if she remains cohabiting (control) and Y_{1i} if she does not (treated). Ideally, the causal effect of separation (D) will be the difference between the two states. However, as has been widely pointed out in the evaluation literature, the two outcomes are not observable for the same individual at the same moment.

Hence, the main idea is to compare intact and separated couples, conditional on a set of pre- separation observable variables (Rosenbaum and Rubin 1983; Imbens, 2004). This implies that a vector of covariates X exists that can make a treatment random, once controlled for:

$$(Y_{1i}, Y_{0i}) \perp D_i | X_i$$

Thus,

$$(Y_{1i}, Y_{0i}) \perp D_i | p(X_i) \tag{1}$$

where $p(X_i)$ is the propensity score defined as $E(D_i/X_i)=P(D_i=1/X_i)$. Hence, observations with an identical propensity score present the same distribution in terms of the set of covariates X_i. Under the mean independence assumption, average treatment effect on the treated (ATET) can be written as follows:

$$ATET = E(Y_{1i} - Y_{0i}/D_i=1) \tag{2}$$

$$= E(X/D = 1\{E(Y_{i1}|X_i, D_i = 1)\} - E(X/D = 1\{E(Y_{i0}|X_i, D_i = 0)\}) \tag{3}$$

The propensity score theorem states that $P(D_i=1/Y_{0i}, p(X_i))$ does not depend on Y_{0i}. Under this assumption:

$$ATET = E[\{E(Y_i/p(X_i), D_i = 1)\} - \{E((Y_i/p(X_i), D_i = 0)/D_i = 1)\}] \tag{4}$$

Usually, the estimation is carried out in two steps. First, the $p(X_i)$ is estimated based on a binary model, and then the effect is computed by matching or weighting observations (Dehejia and Wahba, 1999; Imbens, 2004; Abadie and Imbens).

To carry out the estimation, we implement nearest neighbour matching, which consists of matching every treated unit with the closest control unit according to PSM (Leuven and Sianesi, 2013). Thus, we first estimate a probit PSM equation to obtain a comparable sample of households that separated in the time interval between the two waves and those who remained together. Control variables used are presented in iii), in this section, below.

To assess the goodness of fit of our PSM model, we analyse the number of observations under a common support. The common support condition ($0 < P(D = 1/X)<1$) ensures that all individuals included in our estimations have a positive probability of union dissolution.

Thus, having restricted the sample to the cases under the common support, we estimate the effect of interest. Considering two periods, t when all couples were married or cohabiting and $t+1$ after a subset of unions were dissolved, and outcomes were Y_{0i}^t and Y_{1i}^t respectively for the groups who had separated and those still living together, the double-difference method (DiD-PSM) estimates the average effect of separation as:

$$DiD - PSM = E_{p(X_i)}[E\{(Y_1^{t+1} - Y_1^t)/D_i = 1, p(X_i)\} - E\{(Y_0^{t+1} - Y_0^t)/D_i = 0, p(X_i)\}]$$
$$\tag{5}$$

In this formulation, the effect of the program is calculated as the difference between the differences in the observed outcomes for the treatment and control groups before and after the intervention, conditional on belonging to PSM common support. The DiD-PSM equation can be specified as:

$$Y_{it} = \alpha + \beta D_{i1}t + \rho D_{i1} + \gamma t + \varphi X_i + \eta_i + \varepsilon_{it} \tag{6}$$

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where X is a set of time-variant covariates and η are individual fixed effects. The coefficient capturing the potential effect of union dissolution on the outcome of interest is β. For the DD estimator to be interpreted correctly, the error term must be uncorrelated with the other 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 DD estimator will be biased. Unfortunately, the dataset lacks a suitable instrumental variable to overcome this potential caveat.[5] To discuss this potential problem, we carry out a set of robustness checks. Another caveat of our identification strategy lies in our not being able to check for parallel trends before 2004.

Robustness checks

To evaluate whether omitted variables and selection bias affect our estimations we use a technique proposed by Altonji, Elder and Taber (2005), later expanded upon by (Oster 2016). To implement it, we follow two different approaches. The first is based on measuring the ratio of selection on unobservables to observables (δ) needed to attribute the entire effect of the variable of interest (separation; child support) to selection bias. This procedure is based on the idea that the full set of unobservables and observables would completely explain the outcome, such that the regression R-squared would be 1. For example, $\delta=2$ indicates that to generate a zero treatment effect, unobservables should be twice as important as observables. Altonji, Elder and Taber (2005) suggest that $\delta=1$ would be an appropriate cut-off. In this case, unobservable variables explain as much of the outcome as the actual controls.

The second approach consists of bounding the treatment effect. To operationalize this test, it is necessary to assume a value for δ and a maximum value for R-squared when all the controls (observables and unobservables) are included (R_{max}). Following Altonji, Elder and Taber (2005) we consider that equal selection on observed and unobserved variables is an appropriate bound for δ. Thus, we estimate a bound of the effect (adjusted β) assuming $\delta=1$ and different values of R_{max}, including $R_{max}=1$. We are interested in the stability of the sign of β, that is, whether adjusted β has the same sign as the estimated β (in order to test if the

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[5] Related work uses gender of the first child as an instrument, based on the idea that couples in which the first child is a girl are less likely to split up. However, work by Hamoudi and Nobles (2014) challenges this hypothesis.

interval between the estimated β and the adjusted β excludes 0). As argued by Oster (2016), $R_{max}=1$ may lead to an over-adjustment and $R_{max}=1.3R$ (where R is the R-squared of the estimation on observables) would be an appropriate minimum for R_{max}.

ii) Data

We use two waves of the longitudinal study *Estudio Longitudinal del Bienestar en Uruguay* (ELBU) carried out by the *Instituto de Economia (Universidad de la Republica)* to perform multidimensional well-being assessments.[6] The study 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. Around 87% of population lives in urban areas in Uruguay and 85% of the children living in these areas attended public schools in that year. Thus, our analysis is representative of the cohort, although the richer income strata is underestimated. The sampling frame of this survey was the 2002 Height Census undertaken in all public schools in Uruguay. Survey questionnaires collected information on housing characteristics, income, labour force participation and education for all household members, health data for the reference child at school (including anthropometric measures) and a wide range of questions on well-being, attitudes and opinions of the adult in charge of the child.

This paper is based on the 2004 and 2011/12 waves. In the first wave, 3200 households were interviewed. Panel attrition is 30.1% 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).[7]

The 2004 wave records 1282 married or cohabiting couples. We restrict our analysis to this group and consider that a couple split up between 2004 and 2011/12 if the interviewee declared that the child's parents did not live together in 2011/12. Among this group of households, we discard those cases in which the child was not living with her mother and cases in which the father was dead in 2011/12. Thus, we include the 1220 couples that

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[6] Information on this dataset, survey questionnaires and micro-data can be found at http://www.fcea.edu.uy/estudio-del-bienestar-multidimensional-en-uruguay.html

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

meet our selection criteria. Among them, 212 (16%) separated between the two waves and, within this group, 104 (49.4%) households received child support.[8]

Table A.1 depicts the main characteristics of the sub-sample used in this study and the sub-groups of interest. It can be seen from the table that most baseline characteristics are not statistically different across groups. However, as can be seen in the 2011/12 data, trajectories vary.

iii) Variables

In this section we provide a brief description of the variables used in the estimations. More details can be found in Table A.2. The variables capturing the effects of interest (D) used in this study are *separation* and *child support*. The first one is a binary variable that takes a value of 1 if the couple separated and 0 otherwise. The second one takes a value of 1 if the non-cohabiting father makes child support payments (regardless of frequency and amount), and 0 otherwise.[9]

We study a wide set of household, maternal and child wellbeing indicators. In the first group we include household income, monetary poverty and a composite durable goods index based on the methodology proposed by Filmer and Prittchet (2000). The list of goods and weights is included in Table A.3. Among maternal outcomes we consider income, employment status and hours worked. Regarding the child, we assess school attendance, grade repetition and time spent in a wide set of leisure activities.

The baseline year (2004) covariates included in the estimation of equation (1) were mother's age, marital status, mother's years of schooling, father's years of schooling, participation in religious activities, household members' participation in social activities, teenage motherhood (mother was 17 years or less when she delivered her first child), mother's employment status and region.

For the DiD-PSM estimation (equation 6), the control variables included in vector *X* were mother's age (in maternal and household outcomes estimations) and being a member of an extended household, maternal re-partnering and child's age (in children outcomes

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[8] Percentages were calculated using sampling weights.

[9] 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 might be short- or medium-run ones.

estimations). For implementing the bounding approach version of the robustness checks, R_{max} is the value of the R-squared of an estimation that includes the covariates *extended household* and *re-partnering*, even in the cases of maternal and household outcomes to keep observables as informative as possible with respect to potential selectivity.

III. Main results

In what follows, we first present the estimations needed to build the PSM, which include equations predicting the likelihood that couples that were married or cohabiting in 2004 subsequently experienced separation or divorce, and that non-cohabiting fathers complied with child support payments. After that, we discuss the estimated effects of union dissolutions and child support payments on household well-being (ii), maternal outcomes (iii) and on child outcomes (iv).

    i)   Factors associated with separation and compliance with child support

Table 1 shows the coefficients of the probit models used to create the propensity score. In some cases, specifications show differences among individuals who separated and those who receive child support, which justifies restricting the sample to those cases belonging to a common support.

Column 1 shows coefficients referring to the probability of separation. Since it is relatively widespread for couples to separate, few variables are significantly different from zero at standard confidence levels. In those cases, signs are consistent with international evidence. Married couples are less likely to separate and religiosity is also negatively associated with separation. Propensity to separate is lower among women who had their first child after adolescence and among those who were not in the labour force in the baseline. Meanwhile, it is higher among those who participate in social activities, which might be related to empowerment.

Column 2 contains the estimation results for the probability of receiving child support, conditional on having experienced separation between the two waves. Once again, these findings are in line with previous evidence. The likelihood of receiving child support is lower among women who were mothers during teenagerhood and increases with higher maternal education and wealth. If these two variables are positively correlated with non-custodial fathers' schooling, income and control over economic resources, these effects

could more so reflect that affluent fathers are in a better situation (or are more likely) to comply with child support. However, we find that fathers' education, although position, is not significant. At the same time, these positive effects might be reflecting a higher degree of empowerment among women in this group, which would make them more prone to reach better post-separation agreements or to enforce compliance with child support arrangements. The positive effect of the social participation variable reinforces this interpretation. Interestingly, women who are not employed (either unemployed or out of the labour force) are more prone to receive child support.

Column 3 reports the estimated coefficients of a probit model that compares separated women receiving child support to married or cohabiting women. Most explanatory variables are not statistically significant at usual confidence levels, but there are four relevant variables. Unlike column 1, maternal education is significant and positive and age is significant and negative. These are the same signs obtained in column 2: thus, separated women receiving child support are not only younger and more educated than the ones who do not receive it, but also younger and more educated than the ones who remain in union. The other two variables maintain the sign of column 1: being married presents a negative sign, probably reflecting a lower propensity to separate, and social participation exhibits a positive coefficient.

Table 1. Probit model coefficients estimating the propensity to experience separation/divorce and to receive child support (standard errors in parentheses). 2004

Variables	(1)	(2)	(3)
Age	-0.00960	-0.0346	-0.0180
	(0.00733)	(0.0191)*	(0.00887)**
Married	-0.259	0.148	-0.221
	(0.106)**	(0.224)	(0.131)*
Mother's years of schooling	0.0135	0.106	0.0329
	(0.0165)	(0.0404)***	(0.0192)*
Father's years of schooling	0.00891	0.00529	0.0167
	(0.0172)	(0.0422)	(0.0210)
Religion	-0.385	-0.00724	-0.299
	(0.154)**	(0.355)	(0.189)
Social participation	0.245	0.486	0.316
	(0.139)*	(0.261)*	(0.161)*
Adolescent mother at first child	0.396	-0.544	0.0487
	(0.129)***	(0.248)**	(0.161)
Assets index	-0.0628	0.179	-0.0105
	(0.0436)	(0.0981)*	(0.0507)
Unemployed (mother)	-0.0221	0.821	0.226
	(0.171)	(0.338)**	(0.203)
Out of labour force (mother)	-0.195	0.589	0.0322
	(0.112)*	(0.256)**	(0.135)
Constant	-0.505	-0.519	-1.052
	(0.304)*	(0.768)	(0.378)***
Observations	1,246	204	1,142

Source: own elaboration based on ELBU

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

(1) Sample: all women. The dependent variable takes a value of 1 if the couple split up between 2004 and 2011/12 and 0 otherwise.

(2) Sample: women whose couple split up between 2004 and 2011/12. The dependent variable takes a value of 1 when the father pays child support and 0 otherwise.

(3) Sample: women whose couple split up between 2004 and 2011/12 and receive child support and women whose couple does not split up. The dependent variable takes a value of 1 for the former and 0 for the latter.

In all cases, independent variables correspond to 2004 values. We also control by region using 7 dummy variables.

In Figure 1 we show the PSM histograms by treatment status. There is considerable overlap in propensities in lower regions of the propensity distribution, although it is lower

in higher propensity blocks, which could bias estimates of the average treatment effect for the treated.[10]

Figure 1. PSM histograms

Panel a)	Panel b)	Panel c)
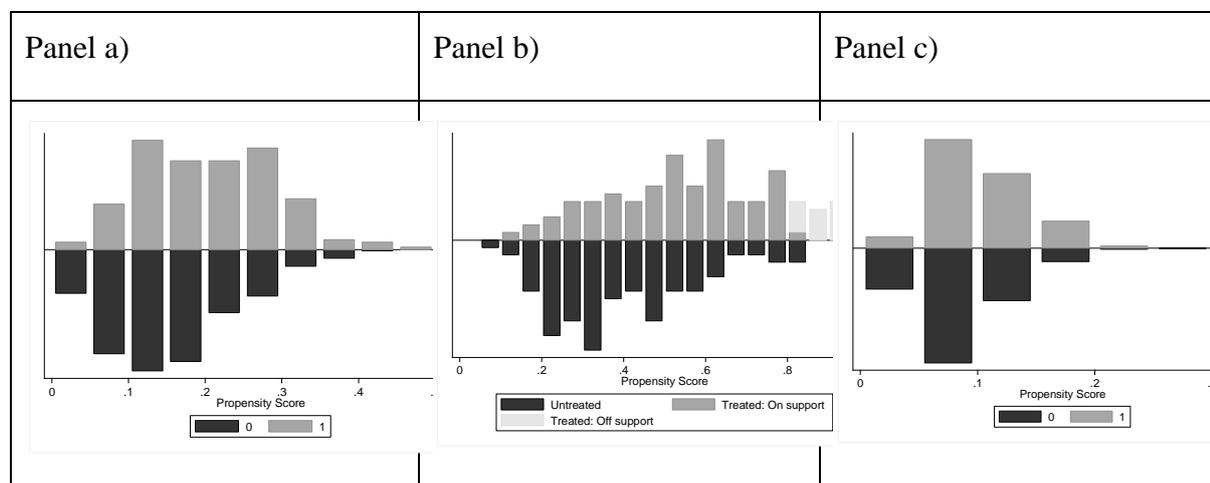
Source: author's elaboration based on ELBU

Legends: panel a) 0 is still married in 2011/12 and 1 is divorced or separated in 2011/12; panel b) 0 is being divorced/separated but not receiving child support in 2011/12; 1 is divorced or separated in 2011/12 and receiving child support; 2 is treated out of the common support; panel c) 0 is still married in 2011/12 and 1 is divorced or separated in 2011/12 and receiving child support.

All observations lie in the common support for the estimation of the likelihood of separation (panel a), whereas for receiving child support among separated women, 14 observations (panel b) do not and so are removed from the difference-in-difference estimation of the effects on outcomes. Finally, in the comparison between separated women receiving child support and those who remained married, all observations were kept.

We also re-estimated the probit models in the common support including the propensity score variable and all variables were not significant, reassuring that the control and treatment groups we created were very similar, at least in observable characteristics. Table A.4 depicts variable means after removing the observations that are not in the common

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[10] We thus tested whether trimming outliers (*n*=144 in (1), *n*=39 in (2)) influenced our findings using the comsup option available in the STATA *pscore* procedure. Estimates from these models do not statistically or substantively differ from those obtained when estimating the average treatment effect for the treated of the larger sample. These ancillary outputs are available from the authors upon request.

support in the baseline year (2004). It can be noticed that the values for the group of separated/divorced women receiving child support in this case is closer to that of the remaining groups.

ii) Household wellbeing

Table 2 reports the estimated effects of separation and child support on household wellbeing using several aggregates reflecting per capita household income (in logs), monetary poverty and access to durable goods. We first report the effect of separation (column 1). In column 2 we show the effect of child support for the subset of mothers that experienced divorce or separation between the two waves and column 3 compares the case of separated mothers receiving child support versus the group of couples that remained married or cohabiting in 2011/12. In Table 3 we report the corresponding robustness checks: δ values (the ratio of selection on unobservables to observables that enables to attribute all the effect to selection bias) and bounds for the effect captured by β (under different assumptions of the value of R-squared). Checks were only carried out for the variables with coefficients which were significant below the 10% threshold. As will be seen below, estimated δ are always very low and when the estimated adjusted β does not reject the null hypothesis (of a zero effect), the assumed R-squared corresponds to the minimum value recommended in the literature.

In line with the international literature, separation leads to a significant wellbeing reduction in terms of access to durable goods and monetary poverty. Our calculations indicate that in the two cases, the loss is around 20% relative to the control group average in the baseline. In turn, disposable per capita household income falls 16%. Results are very similar when subtracting self-declared income from owner-occupied housing. As reported in Table 3, the estimated δ for these variables are negative, indicating that we need unobservables to be negatively correlated with observables to make the true effect of separation equal to zero. But as long as this negative correlation is a very unlikely event, we interpret that the effects obtained are robust.

Table 2. Estimated effect (average treatment effect) of separation and receiving child support on household wellbeing (standard errors in parentheses) [R^2 in brackets]

Variables	(1)	(2)	(3)
Assets index N(1)=2455; N(2)=369; N(3)=2254	-0.570	0.355	-0.475
	(0.113)***	(0.218)	(0.150)***
	[0.425]	[0.224]	[0.444]
Income poverty (yes=1) N(1)=2491; N(2)=378; N(3)=2283	0.160	-0.119	0.107
	(0.0351)***	(0.0646)*	(0.0475)**
	[0.195]	[0.077]	[0.206]
Household income (per capita) *N(1)=2461; N(2)=375; N(3)=2254*	-0.159	0.137	-0.113
	(0.0746)**	(0.141)	(0.111)
	[0.350]	[0.2562]	[0.358]
Household income net of house rental value (per capita) N(1)=2461; N(2)=375; N(3)=2254	-0.162	0.0669	-0.156
	(0.0764)**	(0.143)	(0.112)
	[0.352]	[0.268]	[0.358]
Public transfers (per capita) N(1)=2461; N(2)=375; N(3)=2254	1.000	-1.034	0.412
	(0.239)***	(0.457)**	(0.325)
	[0.030]	[0.182]	[0.009]
Household income net of house rental value and public transfers (per capita) N(1)=2461; N(2)=375; N(3)=2254	-0.251	0.257	-0.157
	(0.159)	(0.312)	(0.222)
	[0.120]	[0.073]	[0.126]
Household income net of house rental value and private transfers received by mothers (per capita) N(1)=2461; N(2)=375; N(3)=2254	-0.315	-0.150	-0.424
	(0.094)**	(0.187)	(0.153)
	[0.279]	[0.133]	[0.282]
Household income net of house rental value, public transfers and private transfers received by mothers (per capita) N(1)=2461; N(2)=375; N(3)=2254	-0.585	-0.253	-0.740
	(0.188)***	(0.389)	(0.293)**
	[0.108]	[0.014]	[0.116]
Mother's income net of public and private transfers (per capita) N(1)=2461; N(2)=375; N(3)=2254	1.041	1.062	1.526
	(0.299)***	(0.571)*	(0.432)***
	[0.176]	[0.343]	[0.169]
Income of the rest of the household minus public transfers (per capita) N(1)=2461; N(2)=375; N(3)=2254	-4.106	-1.206	-4.905
	(0.332)***	(0.669)*	(0.467)***
	[0.196]	[0.349]	[0.188]

Source: author's elaboration based on ELBU

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

Note: income in logs.

(1) Sample: all mothers. The dependent variable takes a value of 1 when the couple split up between 2004 and 2011/12 and 0 when it did not.

(2) Sample: mothers whose couple split up between 2004 and 2011/12. The dependent variable takes a value of 1 when the father pays child support and 0 when he does not.

(3) Sample: mothers whose couple split up between 2004 and 2011/12 and receive child support and women whose couple does not split up. The dependent variable takes a value of 1 for the former and 0 for the latter.

Column 2 in Table 2 indicates that, among separated women, receiving child support does not make a significant difference in household wellbeing outcomes. Although there is an

imprecise effect in the case of poverty, robustness checks presented in Table 3 do not support the conjecture of a child support effect in this case. The estimated δ is much lower than the advised cut-off ($\delta=1$) and enables to reject the null hypothesis ($\beta=0$). Besides, the estimated bounds for β are positive under several reasonable assumptions of R_{max}, indicating, once again, a low robustness of the estimated effect of child support on poverty. Thus, it is not surprising that separated women who receive child support are more deprived in terms of assets and income poverty than women who remain in a union (column 3, Table 2).

The remaining rows in Table 2 explore effects on a set of income aggregates, in order to understand how households cope with a fathers' departure from the household. With regard to public transfers, differences related to separation are significant, with a coefficient very close to 100%. Because of the means-tested nature of child allowances, this result may be due to an increase in relative deprivation among households that experienced separation, which allowed them to increase the chances to qualify for the programme. Thus, household income net of housing rental value and public transfers declines by more (25%) than final income (the above mentioned 16%); that is, public transfers contribute to mitigating the post-separation income fall by approximately 33% (compared to income net of housing value and private and public transfers). The positive effect of separation with respect to income from public transfers survives the robustness checks. Considering $\delta=1$ as an appropriate cut-off, Table 3 shows a very low δ in this case. However, the estimated bound of the effect is still positive when considering $R_{max}=1.3R$, so zero is not included in the estimated interval.

The negative sign of public transfers income in column 2 of Table 2 suggests that separated women who do not receive child support benefit more from transfer policies than those who receive child support. Estimates reported in Table 3 suggest that the estimation is robust ($\delta<0$). This result is similar to the findings for Australia (Fischer, 2015), in which policy design reduces eligibility of those receiving child support. In other words, public transfers and child support may be operating as substitute income sources. This conclusion is also supported by the estimated coefficient of public transfers in column 3, which in this case reflects the lack of substantial differences between separated women receiving child support and women remaining in union.

We next assess the effect of separation on household income net of house rental value and private transfers received by mothers. We are not able to single out child support payments within this income source, but in most of the cases, private transfers are reported only by women who also report receiving child support. Thus, we interpret that private transfers are child support in most cases. In Table 2 we show that income would have fallen 31% (instead of 16%) because of separation if private transfers did not take place. In line with previous results, private transfers exert a relevant effect on per capita household income among separated mothers (0.27 compared to the coefficient corresponding to income before public and private transfers), slightly lower than the one of public transfers. As shown in Table 3, results yield a negative δ.

Table 3. Estimated effect (average treatment effect) of separation and child support on wellbeing: estimates of δ for $\beta=0$ and $R_{max}=1$, and adjusted β under various assumptions on R_{max} and $\delta=1$.

	δ for $\beta=0$ and $R_{max}=1$	Adjusted β for $\delta=1$ and $R_{max}=1$	$R_{max}=2R$	$R_{max}=1.5R$	$R_{max}=1.3R$
Estimation (1): Effect of separation. Sample: all women					
Assets index	-0.292				
Income poverty	-0.128				
Household income	-0.100				
Hh.inc.minus house rental value	-0.099				
Public transfers	0.019	-130.099	-1.935	-0.247	0.306
Hh.inc.minus house rental value & mother's private transfers	-0.1402				
Hh.inc.minus house rental value, public transfers & mother's private transfers	-0.081				
Mother's income	0.079	-21.776	-2.456	-0.611	0.049
Inc. rest of hh.	-2.993				
Estimation (2): Effect of child support. Sample: women whose couple split up between 2004 and 2011/12					
Income poverty	0.015	19.879	1.743	0.829	0.469
Public transfers	-0.081				
Mother's income	0.070	-23.671	-11.818	-4.927	-2.416
Inc. rest of hh.	0.080	19.406	17.941	9.991	6.881
Estimation (3): Effect of child support. Sample: women whose couple split up between 2004 and 2011/12 and receive child support and women whose couple does not split up					
Assets index	-0.279				
Income poverty	-0.095				
Hh.inc.minus house rental value, public transfers & mother's private transfers	-0.118				
Mother's income	0.132	-14.607	-1.093	0.242	0.747
Inc. rest of hh.	-0.511				

Note: all income variables are per capita of the household and in logs
Source: author's elaboration based on ELBU
Note: all income variables are per capita of the household and in logs

Thus, the combination of public and private transfers is crucial to cushion the negative effect of separation on income: removing these two income sources, per capita household income would have fallen 58%. We finally disaggregate mother's income and that of the remaining household members (last two rows in Table 2).

Separation causes a substantial reduction of income earned by other remaining members of the household, which is not surprising if the loss of one earner (the father) is not offset by household recomposition (remarriage, becoming a member of another household, etc.). On the other hand, separation leads to an increase in per capita maternal income that partially outweighs the reduction of income of adult earners remaining in the household. According to the checks presented in Table 3, these results are robust. Although we find that the income increase is higher for women receiving child support than for those who do not (column 2, Table 2), this result cannot be confirmed by the robustness checks (Table 3).

iii) Maternal outcomes

Given the significant increase in per capita maternal income presented in Table 2, in this section we dig into its potential causes, assessing the role of the different income sources, employment and hours worked. In Table 4 we report the estimated coefficients and in Table 5 we include the corresponding robustness checks.

In the first row of Table 4 we report the coefficients corresponding to total maternal income (net of public transfers, in logs). We find a positive effect of separation that suggests that women undertake counteracting strategies to face the income loss stemmed from separation, resulting in a 150% income increase. This positive effect remains significant in the estimation of adjusted β with $R_{max}=1.3R$ (Table 5). In this estimation, mother's income includes private transfers, i.e. child support among other sources. Thus, we subtract private transfers and restrict our analysis to autonomous income and find a big and significant coefficient that indicates a 109% increase in autonomous income. Comparing to the above-mentioned 150%, we see that an important proportion of the positive effect of separation on women's income can be attributed to private transfers. However, other explanatory factors explaining the increase in mothers' autonomous income are studied below.

The estimates reported in column 2, Table 4 suggests that separated women who receive child support do better than the ones who do not in coping with the economic

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disadvantages of separation. But this finding does not survive the robustness checks: a negative sign in adjusted β (for both income and autonomous income) remains with $R_{max}=1.3R$, so we cannot reject the hypothesis that the effect of child support is null.

Table 4. Estimated effect (average treatment effect) of separation and receiving child support on mother's outcomes (standard errors in parentheses) [R^2 in brackets]

Variables	(1)	(2)	(3)
Income less public transfers N(1)=1217; N(2)=199; N(3)=1114 N(4)=2461; N(5)=375; N(6)=2254	1.497 (0.372)*** [0.155]	1.399 (0.721)* [0.333]	2.152 (0.531)*** [0.149]
Autonomous income N(1)=1217; N(2)=199; N(3)=1114 N(4)=2461; N(5)=375; N(6)=2254	1.088 (0.365)*** [0.159]	1.192 (0.696)* [0.310]	1.603 (0.521)*** [0.153]
Labour income N(1)=1217; N(2)=199; N(3)=1114 N(4)=2461; N(5)=375; N(6)=2254	0.788 (0.377)** [0.134]	0.153 (0.706) [0.251]	0.822 (0.550) [0.126]
Employment (yes=1) N(1)=1246; N(2)=203; N(3)=1142 N(4)=2491; N(5)=378; N(6)=2283	0.0752 (0.0419)* [0.042]	0.0192 (0.0810) [0.118]	0.0732 (0.0594) [0.042]
Hours worked N(1)=1234; N(2)=202; N(3)=1131 N(4)=2479; N(5)=377; N(6)=2272	0.329 (0.156)** [0.091]	0.180 (0.298) [0.176]	0.364 (0.209)* [0.086]
Hourly wage N(1)=1234; N(2)=202; N(3)=1131 N(4)=2479; N(5)=377; N(6)=2272	0.515 (0.175)*** [0.153]	0.0394 (0.329) [0.299]	0.477 (0.261)* [0.137]
Only women working in both waves			
Hours worked N(1)=528; N(2)=90; N(3)=477 N(4)=1139; N(5)=174; N(6)=1037	-0.0897 (0.116) [0.045]	-0.0138 (0.219) [0.031]	-0.117 (0.114) [0.051]
Hourly wage N(1)=411; N(2)=62; N(3)=293 N(4)=879; N(5)=134; N(6)=799	0.212 (0.117)* [0.290]	0.0612 (0.231) [0.344]	0.275 (0.144)* [0.289]

Source: author's elaboration based on ELBU

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

Notes: a) income in logs; b) Income less public transfers = capital income + labour income + pensions + private transfers + other income except public transfers; c) Autonomous income = Income less public transfers - private transfers

(1) Sample: all women. The dependent variable takes a value of 1 when the couple split up between 2004 and 2011/12 and 0 when it did not.

(2) Sample: women whose couple split up between 2004 and 2011/12. The dependent variable takes a value of 1 when the father pays child support and 0 when he does not.

(3) Sample: women whose couple split up between 2004 and 2011/12 and receive child support and women whose couple does not split up. The dependent variable takes a value of 1 for the former and 0 for the latter.

Table 5. Effect of separation and child support on mother's outcomes: estimates of δ for $\beta=0$ and $R_{max}=1$, and adjusted β under various assumptions on R_{max} and $\delta=1$.

	δ for $\beta=0$ and $R_{max}=1$	Adjusted β for $\delta=1$ and			
		$R_{max}=1$	$R_{max}=2R$	$R_{max}=1.5R$	$R_{max}=1.3R$
Estimation (1): Effect of separation. Sample: all women					
Income	0.082	-31.108	-2.766	-0.523	0.277
Autonomous income	0.065	-28.381	-2.765	-0.727	0.006
Labour income	0.043	-33.043	-2.572	-0.790	-0.148
Employment	0.018	-10.017	-0.183	-0.023	-0.004
Hours worked	0.035	-20.475	-0.852	-0.228	-0.006
Hourly wage	0.064	-14.003	-1.289	-0.340	0.000
Hourly wage if employed	0.108	-2.697	-0.802	-0.265	-0.075
Estimation (2): Effect of child support. Sample: women whose couple split up between 2004 and 2011/12					
Income	0.075	-27.474	-13.957	-6.098	-3.159
Autonomous income	0.060	-31.389	-12.923	-5.321	-2.556
Estimation (3): Effect of child support. Sample: women whose couple split up between 2004 and 2011/12 and receive child support and women whose couple does not split up					
Income	0.134	-21.318	-1.048	0.566	1.175
Autonomous income	0.109	-19.396	-1.321	0.174	0.742
Hours worked	0.047	-14.284	-0.447	-0.032	0.125
Hourly wage	0.068	-9.877	-0.772	-0.141	0.099
Hourly wage if employed	0.173	-1.606	-0.439	-0.075	0.063

Source: author's elaboration based on ELBU

We next analyse differences in labour market outcomes. As shown in Table 4, separation has a positive significant effect on labour income (an increase of 79%), employment rate (7.5 percentage points), hours worked (33%) and hourly wages (52%). These results are not robust for the R_{max} values implied by the cut-off 1.3R (the adjusted β still has a negative sign). However, adjusted β is positive in all cases under the assumption of $R_{max}=1.25R$. In the overall context of the results we obtained, we are inclined to think that separated women increase their labour earnings relative to the rest as a result of an increase in employment rates and hourly wage.

We next explore hours worked and hourly wages for women who were participating in the labour force in the two waves. Separation does not affect working hours but, relative to those that still cohabit or are married, average hourly earnings of separated mothers increase substantially (around 21%). As in the case of the other maternal labour market outcomes, these signs remain robust only when assuming $R_{max}=1.25R$.

Since all the labour market outcomes show differences between separated women who receive child support and those who do not, we do not find support for the hypothesis that child support demotivates labour market effort.

iv) Children outcomes

The estimated effects of separation and child support on children's outcomes are reported in Table 6 and robustness checks are in Table 7. Unfortunately, we lack of information on relevant potential explanatory channels such as parenting styles and the characteristics of the relationship between the two parents before, during and after family breakdown, so this is a first exploration that needs to be researched further.

The overall results suggest that there is a negative effect of separation on education-related outcomes (Table 6). Apparently, there is a modest negative effect in terms of school attendance (a 4-percentage point fall in its likelihood) and a positive effect on grade repetition (an 18-percentage point rise in its likelihood). As reported in Table 7, these effects are robust. The repetition rate is significantly higher among the group of children that do not receive child support and this result is robust ($\delta<0$).

A mediating factor in these results might be the loss in income and control over assets found in the previous section, which could create a more difficult and unstable economic environment after separation. Also, the fact that children who receive child support from non-custodial fathers do better than children who do not, in terms of repetition –which has been also found in developed countries–, this may be explained by the positive relationship between fathers' transfers and parenting styles. Note, however, that according to findings reported in column 3, children from separated couples are more prone to grade repetition than children from couples that remain together, even when comparing to the group receiving child support.

Consistent with previous findings, separation has a negative effect on time spent studying outside the classroom. Once again, we find a difference between children who receive child support and children who do not: time allocated to this activity is higher for the former. Meanwhile, the estimated coefficient in column 3 of Table 6 is not significant: the effect of separation is negligible for the group of children who receive child support. Finally, we do not find robust results in terms of time devoted to leisure activities. One possible exception is time spent playing sports, which is negatively affected by separation. Although it is worth deeper analysis, if fathers are more involved in this activity than mothers due to cultural and social norms, separation would weaken time allocation to practicing sports.

Table 6. Estimated effect (average treatment effect) of separation and receiving child support on children's educational outcomes (standard errors in parentheses) [R^2 in brackets]

Variables	(1)	(2)	(3)
School attendance (yes=1) N(1)=1246; N(2)=203; N(3)=1142 N(4)=2492; N(5)=378; N(6)=2284	-0.0431 (0.0237)* [0.084]	-0.00125 (0.0477) [0.117]	-0.0428 (0.0323) [0.081]
Grade repetition (number of years) N(1)=1202; N(2)=192; N(3)=1104 N(4)=2446; N(5)=368; N(6)=2244	0.294 (0.0674)*** [0.250]	-0.276 (0.135)** [0.371]	0.134 (0.0938) [0.214]
Grade repetition (yes=1) N(1)=1202; N(2)=192; N(3)=1104 N(4)=2446; N(5)=368; N(6)=2244	0.181 (0.0390)*** [0.259]	-0.151 (0.0769)* [0.415]	0.0956 (0.0543)* [0.222]
Time spent reading N(1)=1046; N(2)=166; N(3)=963 N(4)=2286; N(5)=345; N(6)=2099	-0.188 (0.414) [0.013]	-0.478 (0.719) [0.010]	-0.254 (0.574) [0.013]
Time spent playing sports N(1)=1203; N(2)=193; N(3)=1103 N(4)=2449; N(5)=372; N(6)=2245	-0.719 (0.417)* [0.020]	-0.529 (0.829) [0.008]	-0.956 (0.545)* [0.023]
Time spent using a computer N(1)=1146; N(2)=185; N(3)=1051 N(4)=2388; N(5)=360; N(6)=2189	0.450 (0.927) [0.341]	-0.299 (1.794) [0.331]	0.689 (1.225) [0.345]
Time spent studying outside the classroom N(1)=1222; N(2)=185; N(3)=1122 N(4)=2468; N(5)=374; N(6)=2264	-1.178 (0.389)*** [0.351]	1.639 (0.720)** [0.174]	-0.320 (0.448) [0.391]
Time spent watching TV N(1)=1037; N(2)=165; N(3)=954 N(4)=2282; N(5)=345; N(6)=2095	-0.114 (1.162) [0.052]	-3.864 (2.260)* [0.0548]	-2.092 (1.526) [0.060]

Source: author's elaboration based on ELBU

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

(1) Sample: all children. The dependent variable takes a value of 1 when the parents' couple split up between 2004 and 2011/12 and 0 otherwise.

(2) Sample: children whose parents' couple split up between 2004 and 2011/12. The dependent variable takes a value of 1 when the father pays child support and 0 otherwise.

(3) Sample: children whose parents' couple split up between 2004 and 2011/12 and receive child support and children whose parents' couple does not split up. The dependent variable takes a value of 1 for the former and 0 for the latter.

Table 7. Estimated effect (average treatment effect) of separation and child support on children's outcomes: estimates of δ for $\beta=0$ and $R_{max}=1$, and adjusted β under various assumptions on R_{max} and $\delta=1$.

Variables	δ for $\beta=0$ and	Adjusted β for $\delta=1$ and			
	$R_{max}=1$	$R_{max}=1$	$R_{max}=2R$	$R_{max}=1.5R$	$R_{max}=1.3R$
Estimation (1): Effect of separation. Sample: all children					
School attendance (yes=1)	0.035	1.945	0.083	0.016	-0.008
Grade repetition (number of years)	0.151	-2.524	-0.450	-0.051	0.093
Grade repetition (yes=1)	0.153	-1.493	-0.292	-0.039	0.053
Time spent playing sports	-0.018				
Time spent studying outside the classroom	-0.166				
Estimation (2): Effect of child support. Sample: children of separated parents					
Grade repetition (number of years)	-0.111				
Grade repetition (yes=1)	-0.117				
Time spent studying outside the classroom	0.052	-64.026	-10.368	-3.636	-1.205
Time spent watching TV	0.014	864.174	45.804	20.669	10.659
Estimation (3): Effect of child support. Sample: children of separated parents who receive child support and children of non-separated parents					
Grade repetition (yes=1)	0.097	-1.115	-0.202	-0.048	0.010
Time spent playing sports	-0.029				

Source: author's elaboration based on ELBU

IV. Final comments

Based on a longitudinal study of children attending the first grade of public primary school in 2004, we assessed the effects of separation and child support in Uruguay, on a wide set of household, maternal and child outcomes. We first corroborate that although separation is widespread among Uruguayan couples, the probability of separation is higher among unmarried couples, among those in households exhibiting active social participation (in unions, community services, etc.) but no religious activity, and among mothers who already were in the labour force while cohabiting, and among those who delivered their first child in adolescence. Among separated women, those receiving child support are the ones in higher socioeconomic strata and scoring higher in terms of characteristics related to empowerment: education, social participation, motherhood after adolescence and wealth. However, child support is more likely to be received by mothers who are not employed.

To account for these potential biases, we carried out a combined PSM-DD estimation to determine the causal effects of separation and child support payments on our outcomes of interest. As biases could still exist due to unobservable heterogeneity, we perform the robustness checks proposal by Altonji, Elder and Taber (2005) and Oster (2016).

As attested by the international literature, our results convey that separation causes a significant erosion in the control over means (a 16% overall reduction of per capita household income) and assets (a 20% fall of a durable goods composite index), and consequently an increased poverty incidence (20%). These negative effects exist despite behavioural responses from mothers, and also when there are changed living arrangements, child support and social assistance payments. Public and private transfers play a significant and very similar role in mitigating the per capita household income loss: without the former, income would fall by 25% on average and without the latter, 31%.

Maternal outcomes also experience significant variations that also substantially explain how households cope with the initial income loss. Separation increases labour supply, hours worked and hourly earnings. These findings are similar across all groups of separated women. This indicates that the behavioural responses are similar regardless of whether receiving child support. These results suggest that maternal labour effort is a very important element in offsetting the income loss caused by separation. However, the existing evidence for developed countries shows a mild effect on labour market outcomes. Several factors may explain these differences. On the one hand, the public transfer system is more generous in developed countries and child support enforcement is probably stronger than in Uruguay. On the other hand, the period under study was characterized by rapid economic growth, so behavioural responses among separated women had room to be effective. Another important point relates to the age of the children when separation took place: in our study, children were school-aged so childcare constrains were less binding than in studies assessing small children. In any case, the substantial increase in the capacity to generate labour earnings raises questions about whether this increased labour effort turns out to reduce mothers' leisure time, that need to be studied further.

Regarding child outcomes, there is a mild negative effect on secondary school attendance (4 percentage points) and also on the likelihood of repetition (around 18 percentage points), whereas the time devoted to study outside of the classroom is reduced. Although we are not able to test mediators referring to parenting, depression among mothers and the

quality of the relationship among parents, the loss in material resources might be also at play. Among the sub-group of children receiving child support, the negative effects of separation are lower and are negligible for attendance. We cannot disentangle whether this is a causal effect of child support or if it is reflecting higher parental involvement. This point needs to be studied further since it may be expected to have relevant policy implications.

It must also be recalled that this exercise allowed us to investigate short- and medium-run effects. Further waves of this panel will enable us to assess the long-run effects of parental separation and differences in transitions to adulthood.

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Table A.1. Sample characteristics by wave. Means (standard deviations in parentheses)

Variable	Total	Married or cohabiting in 2011/12	Separated/divorced in 2011/12		
			All	Not receiving child support	Receiving child support
Age 2004	34.1	34.4	32.6	32.4	32.9
	(6.8)	(6.9)	(6.1	(6.0)	(6.2)
Household income (log)					
2004	7.8	7.9	7.7	7.6	7.9
	(13.0)	(1.0)	(1.1)	(0.9)	(1.3)
2011/12	8.5	8.5	8.2	8.0	8.4
	(0.8)	(0.8)	(0.8)	(0.7)	(0.9)
Household income before public transfers (log)					
2004	7.5	7.6	7.4	7.3	7.5
	(1.8)	(1.7)	(1.8)	(1.5)	(2.1)
2011/12	8.3	8.3	7.9	7.7	8.1
	(1.4)	(1.3)	(1.5)	(1.4)	(1.7)
Mother's autonomous income (log)					
2004	3.8	3.7	3.9	3.8	4.0
	(3.6)	(3.6)	(3.6)	(3.4)	(3.7)
2011/12	5.5	5.2	6.9	6.3	7.5
	(3.5)	(3.6)	(2.8)	(2.9)	(2.4)
Mother's employment rate					
2004	0.6	0.6	0.6	0.6	0.6
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
2011/12	0.7	0.7	0.8	0.8	0.7
	(0.5)	(0.5)	(0.4)	(0.4)	(0.4)
Mother's weekly hours worked					
2004	19.5	19.5	19.7	19.1	20.4
	(23.1)	(23.0)	(23.5)	(22.1)	(25.1)
2011/12	26.0	25.0	31.0	31.1	30.8
	(22.2)	(21.9)	(23.0)	(23.0)	(22.7)
Assets index					
2004	2.7	2.8	2.4	2.8	2.8
	(1.7)	(1.7)	(1.7)	(1.8)	(1. 8)
2011/12	3.9	4.0	3.0	3.6	3.6
	(1.8)	(1.8)	(1.8)	(1.7)	(1.7)
Income poverty (incidence)					
2004	0.8	0.8	0.8	0.7	0.7
	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
2011/12	0.5	0.5	0.7	0.6	0.6

	(0. 5)	(0.5)	(0.5)	(0.5)	(0.5)
Child age 2004	6.4	6.4	6.4	6.3	6.4
	(0.6)	(0.6)	(0.5)	(0.5)	(0.6)
Child school attendance					
2004	1.0	1.0	1.0	1.0	1.0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
2011/12	0.92	0.93	0.89	0.89	0.88
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Grade repetition					
2004	0.09	0.08	0.10	0.12	0.09
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
2011/12	0.09	0.08	0.10	0.12	0.09
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)

Source: author's elaboration based on ELBU

Table A.2. Variables description

Variables	Description
Treatment variables	
Separation	A couple is considered to be separated if its members were not living together in 2011/12. To reflect this, we created a dummy variable that takes a value of 1 if the couple split up and 0 otherwise. By definition, all observations used in this study are 0 in 2004.
Child support	The 2011/12 questionnaire gathers information on whether non-cohabiting parents make child support payments and their frequency. We built a variable that takes a value of 1 if the non-cohabiting father complies with child support payments (regardless of frequency), and 0 otherwise.
Household wellbeing	
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.
Household income net of house rental value (per capita)	Corresponds to household income minus estimated housing rent, deflated by the Consumer Price Index and expressed in logarithms and in per capita terms.
Assets index	Composite durable goods index based on the methodology proposed by Filmer and Prittchet (2000). The list of goods and weights is presented in Table A.2. For the two waves, weights correspond to the 2011/12 estimation.
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.
Household income net of house rental value and public transfers (per capita)	It is equal to household income minus estimated housing rental value and public transfers, deflated by the Consumer Price Index and expressed in logarithms and per capita terms.
Mother's income (per capita)	Mother's income (excluding estimated housing rent and public transfers), deflated by the Consumer Price Index and expressed in logarithms and per capita.
Income of the rest of the household members (per capita)	Household income except mother's income (excluding estimated housing rental value and public transfers), deflated by the Consumer Price Index and expressed in logarithms and household per capita terms.
Maternal outcomes	
Income less public transfers	Mother's income (excluding estimated housing rent and public transfers), deflated by the Consumer Price Index and expressed in logarithms.
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.
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.
Hourly wage	Mother's labour income per hour deflated by the Consumer Price Index and expressed in logarithms.
Children outcomes	
School attendance	It takes a value of 1 when the child attends school and 0 otherwise.
Grade repetition	We use two different outcomes. One is the number of times that the child repeated one year of school; the other is a dummy variable that takes a value of 1

	when the child repeated at least once 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.
Variables used to compute the PSM	
Age	Age of the mother in years in 2004.
Married	Dummy variable that takes a value of 1 when children's parents were married in 2004 and 0 if they cohabited but were not married.
Mother's years of schooling	Number of years completed in the formal educational system by the mother in 2004.
Father's years of schooling	Number of years completed in the formal educational system by the father in 2004.
Religion	Dummy variable that takes a value of 1 when at least one household member took part in religious activities in the last year (in 2004) and 0 otherwise.
Social participation	Dummy variable that takes a value of 1 when at least one member of the household participated in activities, such as trade unions or entrepreneurial associations, activities in the neighbourhood, political parties, etc. in the last year (in 2004) and 0 otherwise.
Adolescent mother at first child	Dummy variable indicating whether the mother was 17 years or less when she had her first child.
Assets index	Composite durable goods index based on the methodology proposed by Filmer and Prittchet (2000). Weights correspond to estimation for 2004.
Unemployed (mother)	Dummy variable that takes a value of 1 when the mother is unemployed and 0 otherwise. Omitted variable: employed.
Out of labour force (mother)	Dummy variable that takes a value of 1 when the mother is out of the labour force and 0 otherwise. Omitted variable: employed.
Geographical area	Set of dummy variables capturing 8 geographical areas.
Controls in household wellbeing and maternal outcomes	
Mother's age	Age of the mother in years.
Controls in children's outcomes	
Child's age	Age of the child in years.
Extended household	Dummy variable that takes a value of 0 when all the members of the household are siblings, mother or father of the child(ren) and a value of 1 when there is at least one household member that has a different kinship relationship with the child.
Mother's repartnering	Dummy variable that takes a value of 1 when the mother lives with a new partner (married or not) in 2011/12 and 0 in other cases.

Table A.3. Assets index: variables included and weights obtained from multiple correspondence analysis

Variable	Categories (has a …)	Weights Wave 1	Weights Wave 2
Boiler	No	2.088	2.335
	Yes	-0.712	-0.589
Cooker	No	0.302	0.211
	Yes	-0.697	-0.378
Microwave oven	No	1.014	1.491
	Yes	-1.735	-1.155
Music equipment	No	1.292	0.971
	Yes	-0.592	-0.416
Dishwasher	No	0.069	0.052
	Yes	-2.671	-2.369
Clothes iron	No	1.592	1.543
	Yes	-0.618	-0.653
Vacuum cleaner	No	0.668	0.719
	Yes	-2.044	-1.699
Car	No	0.494	0.644
	Yes	-2.014	-1.762
Telephone (landline)	No	1.527	1.490
	Yes	-0.766	-0.917
Mobile telephone	No	1.530	1.057
	Yes	-0.441	-0.064
Video or DVD	No	1.231	1.305
	Yes	-1.063	-0.545
Refrigerator	No	2.685	3.171
	Yes	-0.242	-0.115
Washing machine	No	1.633	2.334
	Yes	-0.999	-0.675
TV	No	0.603	0.906
	Yes	-1.166	-1.049
Computer	No	0.774	1.704
	Yes	-1.929	-1.208
Internet connection	No	0.156	1.475
	Yes	-2.846	-1.428
Heater	No	1.192	1.024
	Yes	-0.986	-0.718
Inertia, 1st dim.		94.03	92.93

Table A.4. Balance. Variable means and *standard deviations* after matching. Baseline (2004)

Variable	Married or cohabiting in 2011/12	Separated / divorced in 2011/12, mothers	Separated in 2011/12: not receiving child support	Separated in 2011/12 receiving child support
Mother's age	34.40	32.60	32.36	32.19
	-6.88	-6.12	6.00	5.86
Household income (log)	7.85	7.71	7.56	7.70
	-0.99	1.11	0.88	1.30
Household income before public transfers (log)	7.59	7.43	7.32	7.31
	-1.72	1.81	1.51	2.19
Mother's autonomous income (log)	3.75	3.87	3.78	3.63
	3.56	3.57	3.42	3.67
Mother's employment rate	0.58	0.59	0.60	0.55
	-0.49	0.49	0.49	0.50
Mother's weekly hours worked	19.51	19.73	19.09	19.73
	22.99	23.55	22.09	25.94
Assets index	2.77	2.40	2.82	2.52
	-1.73	1.68	1.83	1.66
Income poverty (incidence)	0.77	0.80	0.73	0.79
	-0.42	0.40	0.45	0.41
Child age	6.36	6.37	6.34	6.41
	0.57	0.53	0.50	0.56
Grade repetition	0.08	0.10	0.12	0.10
	0.28	0.31	0.32	0.30

Source: author's elaboration based on ELBU