

Is PROGRESA Enough to Prevent Adolescents from Dropping Out of School? The Role of Gender, Bullying, and the Death of a Parent

Adan Silverio Murillo *

November 10, 2016

Abstract

The Mexico's conditional cash transfer program (CCT), PROGRESA, is well-known for its positive impacts on education, and more than 25 countries have replicated the model. However, 35% of adolescents between 14 and 17 years from families participating in the PROGRESA program drop out of school. This paper investigates why PROGRESA fails to prevent a substantial number of students from dropping out, and finds that bullying and the death of a father are important factors. I exploit an unusually rich data set that includes information about psychological conditions of adolescents, as well as their social environments. To assess the problem of omitted variable bias, I use two newly developed bounding methodologies. I find that boys have higher rates of bullying than girls, but bullying affects only girls' probability of dropping out of school. In particular, I find that a one standard deviation increase of being bullied increases the probability of not being enrolled in school by approximately 6 percentage points. Likewise, the death of a father affects only girls, and after losing their fathers, girls are 30 percentage points more likely to stay at home and not study. Finally, I do not find evidence that the death of a mother affects the probability of dropping out of school for either girls or boys. While PROGRESA has positive effects on education, its current design does not protect individuals, particularly girls, from the social cost of bullying and from major life-changing events such as the death of a father.

JEL Classification: J10, J21, I24

Keywords: Education, bullying, adolescents

*University of Minnesota. E-mail:silve346@umn.edu

1 Introduction

According to the Sustainable Development Goals (SDGs), it is expected that all girls and boys will complete their secondary education by 2030 (United Nations, 2015). While the current statistics for completing primary education exceeds 90 percent in developing countries, the principal challenges of this goal comes from secondary education, where the completion rate is 72 percent (United Nations, 2016). In order to achieve this goal, it is necessary to understand which policies can be implemented to guarantee access to education for both girls and boys. Among the current policies, conditional cash transfers (CCTs) have systematically proved to be effective in increasing school enrollments and reducing dropout rates by offering cash transfers to families living in poverty on the condition that they send their school-age children to school (Kremer et al. 2013, Snilstveit et al. 2016). These programs were started in Mexico by the well-known social program *PROGRESA*. This program showed positive impacts on school enrollment,¹ and based on this evidence, more than 25 countries have replicated the model around the world.

However, are conditional cash transfers (CCTs) enough to prevent adolescents from dropping out of school? In the case of *PROGRESA*, 35 percent of adolescents between 14 and 17 years from families *participating in this program* are no longer attending school, and this rate is ten percentage points above the national average (Gutiérrez, Norman and Alcalá, 2013).² This paper investigates why *PROGRESA* fails to prevent a substantial number of students from dropping out, and finds that bullying and the death of a parent are important factors.

The *PROGRESA* program focuses on the role of monetary incentives, and ignores psychological factors. Yet, the death of a parent and being bullied have consequences for the well-being of adolescents and school outcomes. Specifically, Sarzosa and Urzúa (2015) find

¹For example, the program resulted in one additional year of school in the adolescents who are beneficiaries (Skoufias and Parker 2001).

²The reason why these families are still participating in the program is because at least one other child within the household is receiving a *PROGRESA* scholarship and attending school.

that being bullied at school generates depression, stress, and overall dissatisfaction with life, and Brent et al. (2009) find that the death of a parent can generate depression and low self-esteem in adolescents. In addition, these factors increase the probability of dropping out of the school. For example, Waddell (2006) finds that adolescents with low self-esteem complete fewer years of the secondary school. As a consequence, the death of a parent and being bullied can be important factors to explain why young people are dropping out of the school.

Furthermore, the death of a parent and being bullied have different consequences depending on the gender of the individuals affected. Marks, Jung and Song (2007) find that the death of the father has more negative effects on the psychological well-being of the son than the daughter, and the death of a mother has more negative effects on the daughter than the son. Concerning bullying, Loeber and Keenan (1994) present evidence that boys suffer more bullying than girls, but bullying affects more negatively the well-being of girls than boys. This result is defined as the “gender paradox effect.” Regarding labor decisions, the consequences from the death of a parent can vary depending on the gender of the deceased parent and the gender of the adolescent. For example, consider that when a father dies, the son may substitute for the lost labor due to his father’s death by dropping out of school and going to work; or on the other hand, when a mother dies, the daughter may substitute for her mother’s domestic duties within the household. The potential consequences depend on the preferences of the members of the household and on labor resources.

To understand the effect of bullying and parental death on the probability of dropping out of school, I exploit an unusually rich data set for 1,091 adolescents between 13 and 16 years from families participating in the *PROGRESA* program that includes information about their psychological conditions and social environments. The bullying indicator is based on Rigby (1998), and consists of the following five items: (a) other students bothered me at school (pulling my hair, throwing objects at me, etc.); (b) other students called me bad

names at school; (c) other students intentionally left me out of activities at school; (d) other students threatened to hurt me at school; and (e) other students physically assaulted me at school. Finally, I use the following variables to measure the absence of at least one parent inside a household: a father has died, or a mother has died.

A study of this type inevitably presents some econometric challenges. In particular, bullying and the death of a parent may be correlated with confounding variables, which may generate bias in the estimated impacts of the variables of interest. To assess the problem of omitted variable bias, I use two recently developed bounding methodologies: one developed by Oster (2016) and the other by Krauth (2016). A common approach to evaluate robustness to omitted variable bias is to include additional control variables on the regression. If such additions do not affect the coefficient of interest, then this coefficient can be considered reliable. This strategy implicitly assumes that adding controls is informative about the unobservable variables. Both Oster (2016) and Krauth (2016) formalize this idea, and they also provide conditions for bounds and identification.

I find that boys have higher rates of bullying than girls. However, while considering dropout rates, I find bullying has consequences for girls, but not for boys. In particular, I find that a one standard deviation increase in being bullied increases the probability of girls dropping out of school by approximately 6 percentage points. Furthermore, I find the death of a father affects only girls, and as a consequence, these girls are 28 percentage points more likely to drop out of school. Finally, I do not find evidence that the death of a mother affects the probability of dropping out of school for either girls or boys.

PROGRESA demonstrates positive effects on education, but its current design does not protect individuals, particularly girls, from the social costs of bullying and the death of a father. This raises the question of what can be done to protect young people from these types of events. In order to design better public policies for addressing the problem of bullying,

it is necessary to understand its causes; including the possibility that participating in the *PROGRESA* program can generate a negative social stigma.

Regarding the impact from the death of the father, it is unclear if the channel for dropout rates is a psychological problem, an economic decision based on changes in a household's labor supply, or both. I find the death of a father has no effects on self-esteem, locus of control, or stress of adolescents, which opens the possibility that the effects are more related to economic issues. Also, my results illustrate that when a father dies, the daughter is more likely to drop out of school, stay at home, and not work for a salary. In conclusion, it is necessary to explore potential policies that can complement conditional cash transfers programs, such as offering a life insurance that covers the lost of income due to the death of a father.

The rest of the paper is organized as follows. Section 2 introduces some related literature. In Section 3, I introduce the data and the empirical strategy. In Section 4, I present the results, and I conclude with Section 5.

2 Related Literature

In 1997 the Mexican government implemented *PROGRESA* (Programa de Educación, Salud y Alimentación). The program offered cash transfers to families living in poverty on the conditions that they send their school-age children to school.³ The scholarship amounts for school-age children increase as they reach higher grades levels. The size of the scholarship under *PROGRESA* is designed to cover the opportunity cost to the family of keeping their children in school. This opportunity cost is measured as the potential salary those children

³In addition, the adolescents need to participate in local health clinics on a regular basis.

could obtain by working (Levy and Rodríguez, 2005). The evaluations to the program has been shown to have positive impacts. For example, it increased years of schooling by one year for adolescents who participated in the program (Skoufias and Parker, 2001), and for children between 12 and 36 months who participated in *PROGRESA* were one centimeter taller (Behrman, et. al. 2008). In 2002, the program changed its name to *Oportunidades*. Based on its original success, the program was expanded to include five million families (i.e. one in five families in Mexico) and extended the scholarships to upper secondary school students. Also, a new incentive was incorporated called *Jóvenes con Oportunidades*, which gives money directly to the students who complete upper secondary education. Under *Oportunidades*, the program increased its presence in urban areas. For the period from 2008 to 2010, the number of participating families in urban areas increased from 759,494 to 1,559,494. In 2015, the program changed its name to *PROSPERA*, adding new components in order to promote productive activities among the women, such as access to credits at a low interest rate. Today, the program reaches more than 6.8 million families in Mexico.

Despite the success of *PROGRESA*, the percentage of lower secondary students from families participating in the program who continued onto upper secondary school was below 60% until 2010 (see Figure 1). From 2011 to 2014, this percentage increased from 64.5% to 71.4%. While this increase is considerable, almost 30% of adolescents do not reach upper secondary school.⁴ Gutiérrez, Norman and Alcalá (2013), using a representative sample from *PROGRESA*, find that 35% of adolescents between 14 and 17 years old whose families participated (due to have at least one children in the program) were not enrolled in school, and this percentage is higher than the national rate of 27%.

A young person who is not studying is very likely to have a lower long-run income.

⁴It is possible that this result is consequence of the expansion of the program to urban areas. When the program was predominantly in rural areas, the transition from lower secondary to upper secondary was below 60%. But, when the program incorporated a considerable number of children in urban areas this percentage increased to 71.4%. In other words, this increase in the percentage is potentially capturing the higher rates of enrollment in urban areas rather than successful improvements of the program.

Bentaouet and Székely (2014), using data from Mexico, find that having a post-secondary education is associated with income levels about 3.5 times higher than those observed for individuals with only a lower secondary education, and 2 times higher than those for individuals with an upper secondary education. The scholarships under *PROGRESA*, as previously mentioned, are designed to cover the opportunity cost to the family of keeping their children in school. If the returns to education are high in Mexico and the opportunity cost is covered, one would expect the students in the program to continue attending the school. However, the program design did not contemplate other potential factors that can increase the cost of attending school (such as bullying) or life-change events that reduce families' incomes (such as the death of a parent).

Székely (2015), using a national survey of young people between 15 and 17 years old who are not attending school, finds that the principal reasons reported for not studying were (see Table 1): lack of money (39%); lack of interest in school (10.6%); the student failed some courses (10%); and teenage pregnancy (5.9%). When analyzing the data for adolescents who received scholarships from *PROGRESA*, he found that lack of money is still the most common reason, but the percentage is reduced to 24%. More interesting is the question related to dropping out of school as a consequence of harassment by other students. At the national level the percentage of students who reported this reason is only 2.8%, but this reason is 11.3% for adolescents who have a *PROGRESA* scholarship. Thus opens the possibility that being part of *PROGRESA* can generate a social stigma.

According to INEGI (2014), 32.2% of students in Mexico between 12 and 18 years old were victims of abuse by their classmates. To the best of my knowledge, there are no studies in Mexico about the causal effects of bullying on dropping out of school, yet it is clear that being bullied has negative consequences on personality. Sarzosa and Urzúa (2015) find that being bullied at school causes depression and stress. The negative effects of bullying go far beyond the classroom. Eriksen *et al.* (2012), using Danish data, find that bullying increases

the probability of teenage pregnancy. Brown and Taylor (2008), using the British National Child Development Study (NCDS), find that bullying at school influences future income received throughout adulthood. Waddell (2006) finds that adolescents with low self-esteem complete less years of upper secondary school education and are less likely to be employed as adults. As a consequence, being bullied can be an important factor to explain why young people are dropping out of the school.

Regarding life-changing events, the absence of a parent also has consequences for the emotional well-being of the individual, and potentially increases the probability of dropping out of school. Case, Paxson and Ableidinger (2004), using information from 10 sub-Saharan African countries, find that orphans are less likely to be enrolled in school than non-orphans. The death of a parent can also have effects on the labor decisions of a household's members. For example, when a mother dies, the daughter may substitute for the labor of her absent mother within the household, which results in the daughter choosing to drop out of school and doing domestic duties at home. In addition, the death of a parent can have consequences for the well-being of the children that can affect their motivation to continue studying. Brent, et al. (2009) find that the death of a parent can generate depression and low self-esteem in adolescents. Marks, Jung and Song (2007) find that gender of the parent who has died is important as well. The death of the father has more negative effects on the psychological well-being of the son than on the daughter, and the death of a mother has more negative effects for the daughter than for the son.

3 Data

I use a database that was developed in 2010 to analyze the conditions of poor families who were participating in Mexico's *PROGRESA* conditional cash transfer program. The survey collected information on non-cognitive skills from adolescents and their parents. First, it

was collected information from the parents, and then collected information from their children. A random sample of 2,112 households was selected from families participating in the program in both rural and urban areas. In the case of the adolescents, it was decided to collect information from those between 13 and 16 years old. From these 2,112 households, 957 were identified as having children between 13 and 16 years old, and the total number of such adolescents in these 957 households was 1,275. The survey collected information from 1,093 of these adolescents in 837 households. Two children who never went to school were excluded, so the final sample for this study is 1,091 adolescents.

Of these 1,091 young people between the ages of 13 and 16, 65.4% were attending school and not working outside the home, 11.5% were working outside the home and not attending school, 14.9% were working outside the home and attending school; and 8.2% were neither working outside the home nor attending school (see Table 2).⁵ However, there are important differences between boys and girls. Regarding the adolescents who neither work outside the home nor attend school, the percentage of boys in this group is only 3.3%, while the percentage of girls is four times higher (14.3%). In the case of the adolescents who are working outside the home and not attending school, the percentage of girls in this group is 5.2%, while the percentage of boys is more than three times higher (16.5%).

There are 5.4% children for whom one of the parents has died, and 4.4% who have a parent in prison (see Table 3). These percentages are similar regardless of gender. Regarding bullying, 11.2% reported some type of harassment from classmates,⁶ being 14.4% for boys and 7.2% for girls.

The data also contain information on whether girls have become pregnant and whether

⁵The survey asked these adolescents about their current labor-education situation. The adolescents responded by selecting the group that they were most closely related to, i.e. attending school and not working outside the home, working outside the home and not attending school, working outside the home and attending school; and neither working outside the home nor attending school.

⁶The questions regarding bullying have the following categorical answers: “always”, “frequently”, “rarely” and “never”.

boys have impregnated girls. Overall, 4.8% of these adolescents stated they are in this situation. However, this percentage is 5.5% for girls and 4.2% for boys (see Table 3). Regarding health problems, 6% of the adolescents have (or have had) a disease that interferes (interfered) with their activities. This percentage is higher for girls (6.6%) than for boys (3.9%). Concerning siblings, on average, these adolescents have three siblings, of which two are older. Table 3 also reports information about alcohol consumption of parents. The adolescents reported that 2.3% of their mothers consume alcohol, while the percentage is 24.6% for fathers. Regarding insecurity, these adolescents were asked questions about observing the following activities in their neighborhood: gangs, people selling drugs, and prostitution. On average, boys observe more of these activities than girls, for example, 32.0% of boys have observed people selling drugs, while this percentage is 23.8% for girls (see Table 3).

I develop an index based on principal components for each of the following variables: bullying, self-esteem, authoritative parents, and family support. The bullying index is based on Rigby (1998), and the self-esteem index is based on Rosenberg (1965). The measure of authoritative parenting style is based on Arnold, O’Leary, Wolff and Acker (1993) and Robinson et al. (1995). Finally, the family support scale is based on Millburn (1987) and Zimet, Dahlem, and Farley (1988). All the tests were adapted by Palomar (2015) in Mexico. The questions have the following categorical answers: “always”, “frequently”, “rarely” and “never”. I aggregate those answers into scales using principal components analysis where only one latent factor was retained.⁷ Then I rescaled the value of the latent variables to have a mean of zero and a standard deviation of one. The results show that there is little difference between boys and girls regarding self-esteem, authoritative parents, and family support. However, on average, boys suffer more bullying than girls (see Table 3).

⁷I present the results of the principal components in Table A1 of the appendix. Column 1 presents the scales with its eigenvalues, Column 2 presents the questions used to build each scale, and Column 3 shows the loading associated with each question.

4 Estimation Strategy

4.1 Establishing Causality

This paper analyzes the effects of whether a parent has died and bullying on the probability of dropping out of school for adolescents participating in *PROGRESA*. The model to estimate is given by:

$$Y = \beta X + \gamma W + e .$$

where: Y is the outcome of interest (a dummy variable indicating whether an adolescent has dropped out of school); X is a vector of the variables of interest (bullying and whether a parent has died); W is a vector of observed control variables; and e is the error term.

However, a study of this type potentially presents some econometric challenges. The measure of bullying is almost certainly imperfect, so there is a potential problem of measurement error. It is well-known that when regressors are measured with random error, the parameters estimated tend to be biased toward zero. In contrast, measurement error is unlikely to be a problem in the case of the death of a parent. These types of events are difficult to forget or lie about them. Another potential problem is omitted variables. Bullying may be correlated with other psychological variables not present in the data, and if such variables are correlated with the outcome of interest, then they can generate bias in estimated impacts of bullying and other observed variables. Similarly, there is no guarantee that the death of a parent is not affected by omitted variables. For example, the literature in psychology has found that the death of a parent affects many well-being variables such as self-esteem, stress, self-control, among others. While the data is rich on psychological variables, there is no guarantee that it includes all the variables affected by the death of a parent. Finally, reverse causality is unlikely to be a severe problem since it is very unlikely that adolescents who are not studying can cause their parents to die. Reverse causality is minimal for bullying. In

the case of students who dropped out of school, the questions regarding bullying refer to the time when the adolescents were attending school. A potential problem of reverse causality can occur if the drop outs return to the school and affect the level of bullying. However, using data from Mexico, Baron et al. (2016) find that once young people between 15 and 18 years old leave school, it is very unlikely that they will return; thus, it is unlikely that not attending school can affect the level of bullying.

To address the problem of omitted variable bias, I use two recently developed bounding methodologies: one developed by Oster (2016) and the other by Krauth (2016). Consider first the methodology of Oster (2016). A common approach to evaluate robustness to omitted variable bias is to include additional control variables on the right hand side of the regression. If such additions do not affect the coefficient of interest, then this coefficient can be considered to be reliable. This strategy implicitly assumes that selection on observables is informative about selection on unobservables. Oster (2016) formalize this idea, and provides conditions for bounds and identification. The full model has the form:

$$Y = \beta X + W_1 + W_2 + \epsilon.$$

where X is the variable of interest, W_1 contains the *observed* control variables multiplied by their coefficients, i.e. $W_1 = \sum_{j=1}^{J_o} w_j^o \gamma_j^o$, and W_2 contains all *unobserved* variables multiplied by their coefficients, i.e. $W_2 = \sum_{j=1}^{J_u} w_j^u \gamma_j^u$. Finally, ϵ is a random error that represents measurement error in Y . Oster (2016) suggests the following approach to account for omitted variable bias:

(1) Regress Y on X , and report the parameter on X , denoted by β^0 , and the R-squared coefficient, denoted by R^0 .

(2) Regress Y on X and W_1 , and report the parameter on X , denoted by $\tilde{\beta}$, and the

R-squared coefficient, denoted by \tilde{R} .

(3) Using information from (1) and (2), define R_{max} as the overall R-squared of the model, that is the R-squared that would be obtained from a regression of Y on both, observables (X, W_1) and unobservables (W_2). Also, define δ to be a parameter that ensures the equality $\frac{Cov(X, W_2)}{Var(W_2)} = \delta \frac{Cov(X, W_1)}{Var(W_1)}$. In other words, this relationship formalizes the idea that the magnitude and sign of the relationship between X and W_1 provides some information about the magnitude and sign of the relationship between X and W_2 .⁸ Oster (2016) shows, assuming orthogonality between W_1 and W_2 , that $\beta^* = \tilde{\beta} - \delta \frac{(\beta^0 - \tilde{\beta})(R_{max} - \tilde{R})}{(\tilde{R} - R^0)}$ is a consistent estimator of the causal impact of X on Y, β .

But, to estimate β^* , one needs estimates of δ and R_{max} . Oster proposes assumptions for δ and R_{max} that allows one to determine whether β^* is different from zero. Oster (2016) proposes that $R_{max} = \min\{1.3\tilde{R}, 1\}$, where the \tilde{R} is defined above.⁹ An alternative value for R_{max} is given by Gonzalez and Miguel (2015), who used $R_{max} = \tilde{R} + (\tilde{R} - R^0)$. In addition to the R_{max} proposed above, I will use a conservative $R_{max} = 1$. After determining the value of R_{max} , Oster suggests that β^* be calculated for all the following ranges of δ : $0 \leq \delta \leq 1$.¹⁰ This allows one to construct the following set $[\tilde{\beta}, \beta^*]$. If this set excludes zero, the results from the controlled regressions can be considered to be robust to omitted variable bias. In other words, the results indicate that $\beta^* \neq 0$.

One benefit of Oster's bounding methodology is that it provides an intuitive way to arrive at a bounding strategy. However, her approach requires information for two key parameters (R_{max} and δ), and her method does not provide statistical inference about the bounding.

⁸For example, if $-1 \leq \delta \leq 1$, then the variable of interest is no more correlated with unobservables (W_2) than it is correlated with observables (W_1). The case $0 \leq \delta \leq 1$ has a similar interpretation, with the additional assumption that the relationship between X and W_1 have the same sign as the relationship between X and W_2 .

⁹The cut-off value of 1.3 is derived from a sample of 65 papers that have used randomized controlled trials. She determined that using this cut-off allowed 90% of the randomized results to continue being statistically significant.

¹⁰In addition, I will present the results for δ : $-1 \leq \delta \leq 0$.

Krauth's bounding methodology, while more complex, needs information only about δ and provides inference about the bounding based on Imbens and Manski (2004) confidence intervals. His methodology proceeds as follow:

The model is given by:

$$Y = \beta X + W_1 + \epsilon, \text{ where } E(W_1 \epsilon) = 0$$

Krauth specifies δ such that:

$$Cov(X, \epsilon) \sqrt{Var(W_1)} = \delta Cov(X, W_1) \sqrt{Var(\epsilon)}$$

where $\delta \in \Delta = [\delta^L, \delta^H]$, i.e. in a finite interval.

Let $B_x(\Delta)$ be defined as the set of all $\tilde{\beta}$ satisfying:

$$Cov(X, Y - \tilde{\beta}X - W_1) \sqrt{Var(W_1)} = \delta Cov(X, W_1) \sqrt{Var(Y - \tilde{\beta}X - W_1)}$$

Krauth shows that this set is nonempty, and more importantly, that it is possible to identify the infimum and the supremum of this set. As a consequence, a bound around β , can be generated using the infimum as the lower bound and the supremum as the upper bound. See Krauth (2016) for the details of how his approach allows him to obtain the Imbens and Manski (2004) confidence interval for the identified set.

5 Results

To analyze the effects of bullying and the death of a parent on dropping out of school, I first present the results using an OLS regression, and then apply the bounding strategies.¹¹

5.1 Determinants of Adolescents Who Dropped Out of School

Table 4 column 1, presents a linear probability model (OLS regression) of the impacts of father died, mother died, and bullying on the probability of dropping out of school. I control for parent in prison, sex, number of siblings, number of siblings who are older, age, age squared, and whether the location is rural or urban. The results show that when a father has died, it increases the child's probability of dropping out of school by 24.9 percentage points. I do not find evidence that the death of a mother¹² has any effect on the probability of dropping out of school. Finally, a one standard deviation increase in being bullied increases the probability of dropping out of school by 5.2 percentage points. To check for the robustness of these results, column 2 incorporates dummy variables for states, and column 3 uses dummy variables for municipalities. The death of a father and bullying continue to be statistically significant, although their impacts are somewhat diminished.

Given that bullying is measured with error, if this measurement error is random, then the effect presented above is a lower bound. However, it is also possible that estimates of the impacts of both bullying and the death of a parent events are affected by omitted variable bias. One way to assess this problem is to add controls and analyze the stability of the parameter of interest. Table 4, column 4 reproduces the analysis of column 3, but includes more controls. The controls consist of information about girls' pregnancies and boys impregnating girls, the feeling of being insecure within their neighborhoods (existence of gangs, people selling drugs, and prostitution), information about self-esteem and health

¹¹The Oster's strategy uses a linear regression, which explains why I use OLS over other alternatives such as a probit or logit. However, when analyzing the variables of interest (life-changing events and bullying), the results using probit or logit are similar to those using OLS (see Table A2 in appendix).

¹²Part of the reason of this result is the higher standard error due to being a more rare event.

problems (i.e. whether the adolescent has experienced a disease that interferes with their activities), and characteristics of their parents: having authoritative parents, family support, and the alcohol consumption of the mothers and fathers.¹³ The death of a father and bullying continue to be statistically significant. Comparing column 3 with column 4 of Table 4, the coefficient associated with the death of a father decreased slightly from 20.3 to 19.9 percentage points, and in the case of bullying it decreased from 4.8 to 3.7 percentage points.

Oster (2016) shows that just adding controls, which is a common strategy, is not enough to avoid omitted variable bias. Table 5 presents results using Oster’s methodology to analyze the robustness of the results presented above for the death of a father and bullying. Panel 1 presents the results when $0 \leq \delta \leq 1$, i.e. assuming that the relationship between the variable of interest and the (aggregated) controls have the same sign as the relationship between the variable of interest and the unobservables. Column 1 estimates bounds using the value of the R_{max} proposed by Oster (2016), which yields a bounding estimate of [.234, .249]. To provide a similar robustness check, I estimate bounds using the R_{max} proposed by Gonzalez and Miguel (2015). The bounding estimated is [.206, .249]. To further check the robustness of the results, I use the extreme value that $R_{max} = 1$, which yields a bounding estimate of [-0.097, 0.249].

In the case of bullying, using the R_{max} proposed by Oster, the bounding estimated is [.050, .052]. Using the R_{max} proposed by Gonzalez and Miguel, the bounding range is [.047, .052]. Finally, using a conservative $R_{max} = 1$, the bounded estimated has a range of [0.009, 0.052].

Panel 2 presents the results when $-1 \leq \delta \leq 0$.¹⁴ Columns 1 and 2 present the results for the death of a father using the R_{max} proposed by Oster (2016) and by Gonzalez and Miguel

¹³I do not have information on alcohol consumption of the mothers and fathers when the father or the mother have died. These missing values were replaced by the average of the respective variables.

¹⁴The case $-1 \leq \delta \leq 0$ assumes that the relationship between X and W_1 has different sign than the relationship between X and W_2 .

(2015), respectively. I find that the bounds exclude the zero. Finally, using a conservative $R_{max} = 1$, the bounding is [0.249, 0.295]. In the case of bullying, when using the R_{max} proposed by Oster, the bounding estimated is [.052, .054]. Using the R_{max} proposed by Gonzalez and Miguel, the bounding is [.052, .057]. Finally, using a conservative $R_{max} = 1$, the bounded estimated has a range of [0.052, 0.095]. To sum up, in the case of bullying, the result is robust when using Oster’s methodology. However, for the case of the death of a father the bounding includes zero when $0 \leq \delta \leq 1$ and $R_{max} = 1$.

Table 5 column 4, presents analogous results using Krauth’s methodology.¹⁵ Assuming $0 \leq \delta \leq 1$, the bounding associated with the death of a father is [0.193, 0.249], and in the case of bullying is [0.028, 0.052]. The interval confidence at the 95% level associated with the death of a father is (0.016, 0.390), and in the case of bullying is (-0.008, 0.075). Furthermore, using a 90% level, the confidence interval associated with the death of a father is (0.049, 0.364), and in the case of bullying is (-0.0001, 0.071). Assuming $-1 \leq \delta \leq 0$, neither the bounding nor the interval confidence include the zero for both the death of a father and bullying.

Regardless which methodology is used, bullying and the death of a father are robust to the problem of omitted variables when assuming $-1 \leq \delta \leq 0$. When assuming $0 \leq \delta \leq 1$, the death of a father is robust when using Krauth’s methodology, but not when using Oster’s methodology. In particular, when it is assumed a conservative $R_{max} = 1$. In the case of bullying, it is robust to the problem of omitted variables when using Oster’s methodology, including the case when $R_{max} = 1$. However, it is not robust when using Krauth’s methodology. Yet, when using a 90% level confidence, it appears that the confidence interval barely includes zero.

The death of a parent and bullying can potentially have different consequences by sex.

¹⁵To estimate this methodology, I use the command rcr in Stata.

Table 6 reproduces the results presented in Table 4, but differentiating between girls (columns 1 to 3) and boys (columns 4 to 6). When analyzing girls, the results show that the death of a father, the death of a mother, and bullying are statistically significant (see column 1). The results are maintained when dummy variables for states are included (column 2). However, when dummy variables for municipalities are included (column 3), only the death of a father and bullying continue to be statistically significant. Regarding the coefficients associated with these variables, the death of a father increases girls' probability of dropping out of school by 22.1 percentage points, and one standard deviation increase in being bullied increases their probability by 8.3 percentage points. In the case of the boys, the OLS results are presented in Table 6, columns 4 to 6. The regressions are analogous to those presented in columns 1 to 3 for girls. The death of a parent and bullying are statistically significant (see column 4). And the results are maintained when dummy variables for states (column 5) and municipalities (column 6) are included. The death of a father increases boys' probability of dropping out of school by 19.5 percentage points, and one standard deviation increase in being bullied increases their probability by 4.0 percentage points.¹⁶

To analyze the robustness of the results for the case of girls, I again apply Oster's methodology. The results are presented in Table 7. Panel 1 presents the results when $0 \leq \delta \leq 1$. I start by analyzing the effect of the death of a father on the probability of not working and not studying in row 1. Columns 1 and 2 present the results using the R_{max} proposed by Oster (2016) and by Gonzalez and Miguel (2015), respectively. I find that the bounds exclude zero. Finally, using a conservative $R_{max} = 1$, the bounding is [0.268, 0.271]. A similar analysis is conducted for bullying. The estimated bounds using the R_{max} proposed by Oster (2016) and by Gonzalez and Miguel (2015) do not include zero. The result is also robust to the use of a conservative $R_{max} = 1$, given a bounding of [0.091, 0.101].

Panel 2 presents the results when $-1 \leq \delta \leq 0$. Columns 1 and 2 present the results for

¹⁶Regarding the death of a parent, there is no statistical difference between girls and boys. In the case of bullying, the coefficients are statistically different.

the death of a father using the R_{max} proposed by Oster (2016) and by Gonzalez and Miguel (2015), respectively. The bounds again exclude zero. Finally, using a conservative $R_{max} = 1$, the bounding is [0.271, 0.275]. In the case of bullying, when using the R_{max} proposed by Oster, the bounding estimated is [.090, .091]. Using the R_{max} proposed by Gonzalez and Miguel, the bounding is [.089, .091]. Finally, using a conservative $R_{max} = 1$, the bounded estimated is [0.081, 0.091]. So, using Oster's methodology the results for the death of a father and bullying are robust, i.e. their bounds do not include zero.

To further confirm the results of Oster's bounding methodology, I apply Krauth's methodology. The results are presented in Table 7 column 4. The estimated bounds for the death of a father and bullying exclude zero for both $-1 \leq \delta \leq 0$ and $0 \leq \delta \leq 1$. More importantly, the confidence intervals associated with the variables of interest also exclude zero. In the case of the death of a father and bullying, for girls, the results are robust to the problem of omitted variable bias regardless of which methodology is used.

To analyze the robustness of the results for the case of boys, I again apply Oster's methodology. The results are presented in Table 8. When $0 \leq \delta \leq 1$ and $R_{max} = 1$, the bounding is [-0.428, 0.248] for the death of a father and the bounding is [-0.032, 0.037] for bullying. Thus, the estimated bounds include zero. The results using Krauth's methodology are presented in column 4. The estimated bounds for the death of a father and bullying exclude zero. However, when $0 \leq \delta \leq 1$ the confidence interval associated with the variables of interest include zero. So, in the case of boys, the death of a father and bullying are not robust to the problem of omitted variables.

5.2 Determinants of Adolescents Who Neither Work Nor Attend School

In order to obtain greater clarity about the effects of the variables of interest, among the young people who dropped out of school, I will distinguish between adolescents who neither work outside the home nor attending school and adolescents who are working outside the home but not attending school.

Table 9 presents the results similar to these in Table 6, except that the dependent variable is a dummy for the young people who neither work nor attend school, and thus it excludes those who work and do not attend school. The regressions for girls are presented in columns 1 to 3, and for boys in columns 4 to 6. The results for girls show that the death of a father, the death of a mother, and bullying are all statistically significant (see column 1). These results continue to hold when dummy variables for states (column 2) and for municipalities (column 3) are included. Regarding the coefficients associated for these variables, the death of a father increases the probability of neither working nor studying by 26.9 percentage points, the death of a mother increases that probability by 32.3 percentage points, and one standard deviation increase in being bullied increases that probability by 6.7 percentage points. Analogous results for boys are presented in Table 9, columns 4 to 6. The death of the father and the mother are not statistically significant (see column 4). Bullying is statistically significant at the five percent level, and continue to hold when dummy variables for states (column 5) and municipalities (column 6) are included.

To analyze the robustness of the results for the case of girls, Table 10 present results based on Oster's methodology.¹⁷ The bounds for the death of a father are robust when assuming either $-1 \leq \delta \leq 0$ or $0 \leq \delta \leq 1$, and for the different specifications of the R_{max} . In addition, when applying the methodology proposed by Krauth, the estimated bounds and confidence

¹⁷I only check for the robustness of death of a father and bullying because the effect of the death of a mother is statistically significant at only the 10 percent level. So, it includes the zero in its 95% confidence interval.

intervals for the death of a father exclude zero. In the case of bullying, when assuming $0 \leq \delta \leq 1$, it is robust to the problem of omitted variables regardless which methodology is used. When assuming $-1 \leq \delta \leq 0$, bullying is robust using the Krauth's methodology. In the case of the Oster's methodology, bullying is robust when using the R_{max} proposed by Oster and that proposed by Gonzalez and Miguel. The bound includes zero when it is used a conservative $R_{max} = 1$.

Using Oster's methodology, assuming $-1 \leq \delta \leq 0$ and $0 \leq \delta \leq 1$, I find that bullying is robust to the problem of omitted variable bias in the case of the boys (see Table 11). This result is maintained when I use the R_{max} proposed by Gonzalez and Miguel (2015) and a conservative value of one. When I use Krauth's methodology, assuming $-1 \leq \delta \leq 0$ and $0 \leq \delta \leq 1$, I find that the bounds exclude zero (see Table 11 column 4). However, the interval confidence include the zero when $-1 \leq \delta \leq 0$ and $0 \leq \delta \leq 1$. As a consequence, in the case of boys, bullying is not robust to the problem of omitted variable.

5.3 Determinants of Young People Who Work but Do Not Attend School

Table 12 presents results similar to those in Table 6, except that the dependent variable is a dummy for adolescents who work but do not attend school, and thus it excludes those who neither work nor attend school. The regressions for girls are presented in columns 1 to 3, and for boys in columns 4 to 6. For girls, none of the variables associated with the death of a parent are statistically significant, but bullying is statistically significant (see column 1). And these results are maintained when dummy variables for states (column 2) and municipalities (column 3) are included. When analyzing boys, the results show that the death of a father is statistically significant (see column 4), and this continues to hold when dummy variables for states (column 5) and for municipalities (column 6) are included.

To analyze the robustness of the results for the case of girls, Table 13 presents results using Oster’s methodology. The bounds for bullying include zero when $0 \leq \delta \leq 1$ and $R_{max} = 1$. To further confirm the results of Oster’s bounding methodology, column 4 presents results for Krauth’s methodology. The estimated bounds for bullying exclude zero, but the bullying interval confidence includes the zero. As a consequence, bullying is not robust to the problem of omitted variable bias.

For boys, Table 12 shows that only the death of a father is statistically significant and only, at the 10 percent level, so, it includes zero in the 5% confidence interval. As a consequence, checking for robustness is not necessary.

5.4 Channels and Discussion

The death of a father affects only girls’ probability of dropping out of school. In particular, the probability of dropping out of school and not working. However, these results raise other questions: Does the death of a father increase the probability of dropping out of school because it affects the psychological well-being of girls? Or is it because there are labor substitution effects inside the household?

To best answer the last question, I analyze how the death of a father affects the following psychological variables: self-esteem, locus of control, and stress. The results are presented in Table 14. I do not find that the death of a father has effect on self-esteem, locus of control and stress. This result provides some evidence that the potential channel where the death of a father affects the probability of dropping out of school is more economic than psychological. More research is necessary, but one plausible hypothesis is that when the father dies, the mother substitutes for the lost labor due to her husband’s death and the daughter substitutes for her mother’s domestic duties in response.

While *PROGRESA* has positive effects on education, its current design does not protect individuals (particularly girls) from the social cost of bullying and from major life-changing events. This opens the question about what can be done to protect young people from these factors. To design better public policies to attack the problem of bullying, it is necessary to understand its causes, including the possibility that being part of the *PROGRESA* program can generate a negative social stigma.

In the case of the death of the father, it is not clear whether the channel of dropping out from school is a psychological problem, a rational economic decision (i.e. due to changes in household's labor), or both. I find that the death of a parent has no effects on the self-esteem, locus of control, or stress of the adolescents. This opens the possibility that the effects from the death of a father are more related to economic issues. The results presented above show that when a father dies, the daughter is more likely to stay at home and not attend school. It is possible that the mother substitutes for the lost labor due to her husband's death, and the daughter substitutes for her mother's domestic duties in response. If this is the case, an income that covers the opportunity cost of the mother working for a salary can potentially protect the daughter from dropping out of school.

6 Conclusion

This paper investigates the effects of bullying and the death of a parent on the probability of dropping out of school for adolescents who belong to families participating in the *PROGRESA* program in Mexico. Regarding bullying, I find that boys experience more bullying than girls. However, when bullying does occur, it has consequences only for girls, and not for boys. Likewise, the death of a father affects only girls. After losing their fathers, girls are more likely to stay home and not attend school. Finally, I do not find evidence that the death of a mother affects the probability of not attending school for both boys and girls. In terms of public policy, it is necessary to understand what is causing students that are participating in *PROGRESA* suffer more from bullying than students not participating. This includes the possibility that being part of the *PROGRESA* program can generate a negative social stigma. Regarding the impact of the death of a father, it is possible that incorporating a life insurance can protect the adolescents, particularly girls, from dropping out of school.

7 References

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8 Figures and Tables

Figure 1: Percentage of Students from Families Participating in *PROGRESA* who Transited from Lower Secondary to Upper Secondary

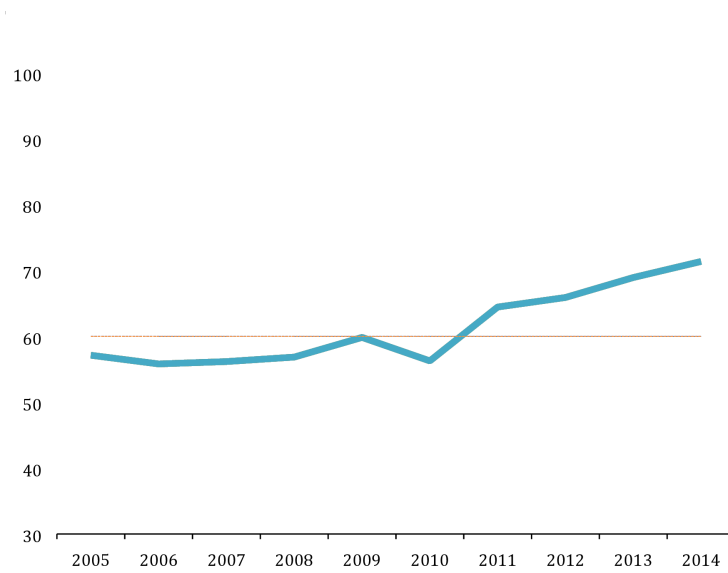


Table 1: Causes of School Dropout among Adolescents between 15 and 17 years by Types of Scholarship

	Total	Without	PROGRESA	Other
	%	Scholarship	Scholarship	Scholarship
		%	%	%
Lack of money	39.4	42.0	24.0	23.0
Lack of interest toward school	10.6	10.7	23.6	0.0
The student failed some courses	10.6	9.8	22.8	10.1
Pregnancy	5.9	5.0	0.0	20.0
Harassment by other students	2.8	2.4	11.3	0.0
Other	30.7	30.1	18.3	46.9

Source: Table adapted from Székely (2015)

Table 2: Education and Labor Situation among Adolescents between 13 and 16 years old

	Total	Men	Women
	%	%	%
All			
Studying	65.4	59.2	73.3
Studying and working outside the home	14.9	21.0	7.2
Working outside the home	11.5	16.5	5.2
Neither studying nor working outside the home	8.2	3.3	14.3
Total	1,091	608	483

Source: Encuesta de resiliencia en beneficiarios de *Oportunidades* .

Table 3: **Basic Descriptive Statistics**

	Total		Girls		Boys	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Parent died	0.054	0.226	0.053	0.225	0.054	0.226
Parent in prison	0.044	0.207	0.045	0.208	0.044	0.206
Bullying (general)	.112	.316	.072	.259	.144	.352
Other students (bullying):						
- Harassed me	.054	.228	.039	.194	.067	.250
- Called me bad names	.070	.256	.045	.208	.090	.287
- Left me out of an activity	.056	.231	.033	.179	.075	.264
- Threatened to hurt me	.036	.188	.020	.142	.049	.216
- Beat me	.032	.178	.016	.127	.046	.209
Pregnancy	0.048	0.215	0.055	0.229	0.042	0.202
Health problems	0.051	0.220	0.066	0.248	0.039	0.194
Siblings	2.666	1.734	2.612	1.753	2.710	1.720
Siblings older	1.778	1.810	1.769	1.854	1.785	1.776
Mother's alcohol consumption	0.025	0.159	0.031	0.174	0.021	0.145
Father's alcohol consumption	0.246	0.431	0.230	0.421	0.258	0.438
Gangs	0.394	0.488	0.383	0.486	0.402	0.490
People selling drugs	0.284	0.451	0.238	0.426	0.320	0.467
Prostitution	0.194	0.395	0.178	0.382	0.207	0.405
Bullying	0	1	-.184	0.803	0.143	1.109
Self-esteem	0	1	0.001	0.966	-0.001	1.003
Authoritative parents	0	1	0.038	0.993	-0.030	1.004
Family support	0	1	0.051	1.022	-0.040	0.981
Rural	0.509	0.500	0.496	0.500	0.519	0.500

Source: Encuesta de resiliencia en beneficiarios de *Oportunidades* .

Table 4: **OLS Estimates: Effects of Life-Changing Events and Bullying on Whether Adolescents Dropped Out of School**

	(1)	(2)	(3)	(4)
Father Died	0.249*** (0.059)	0.228*** (0.059)	0.203*** (0.062)	0.199*** (0.062)
Mother Died	0.159 (0.102)	0.199* (0.101)	0.176* (0.107)	0.162 (0.107)
Parent in Prison	0.046 (0.054)	0.031 (0.054)	0.014 (0.057)	0.004 (0.058)
Bullying	0.052*** (0.011)	0.048*** (0.012)	0.048*** (0.012)	0.037*** (0.012)
Sex (Female=1)	-0.015 (0.023)	-0.015 (0.023)	-0.019 (0.023)	-0.016 (0.023)
Siblings	0.035*** (0.007)	0.029*** (0.007)	0.029*** (0.007)	0.026*** (0.007)
Siblings Older	0.000 (0.007)	0.002 (0.007)	-0.003 (0.007)	-0.003 (0.007)
Age	0.252 (0.324)	0.270 (0.322)	0.435 (0.328)	0.399 (0.328)
Age Squared	-0.006 (0.011)	-0.007 (0.011)	-0.012 (0.011)	-0.011 (0.011)
Rural	0.057** (0.022)	0.071*** (0.026)	-0.037 (0.053)	-0.041 (0.053)
Constant	-2.309 (2.338)	-2.481 (2.323)	-3.606 (2.370)	-3.351 (2.373)
State Fixed Effects	No	Yes	No	No
Municipality Fixed Effects	No	No	Yes	Yes
Other Controls	No	No	No	Yes
R^2	0.13	0.17	0.23	0.25
Observations	966	966	966	965

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

The other controls are: women's pregnancy or men impregnating women (pregnancy), a feeling of being insecure within their neighborhoods (existence of gangs, people selling drugs, and prostitution), self-esteem, health problems, authoritative parents, family support, parents are separated, mother's alcohol consumption, and father's alcohol consumption.

Table 5: **Bounding Methodology: Effects of Life-Changing Events and Bullying on Whether Adolescents Dropped Out of School**

	(1)	(2)	(3)	(4)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)	Krauth (2016)
Panel 1 :			$0 \leq \delta \leq 1$	
Father Died (95% CI) (90% CI)	[0.234, 0.249]	[0.206, 0.249]	[-0.097, 0.249]	[0.193, 0.249] (0.016, 0.390) (0.049, 0.364)
Bullying (95% CI) (90% CI)	[0.050, 0.052]	[0.047, 0.052]	[0.009, 0.052]	[0.028, 0.052] (-0.008, 0.075) (-0.000, 0.071)
Panel 2 :			$-1 \leq \delta \leq 0$	
Father Died (95% CI) (90% CI)	[0.249, 0.264]	[0.249, 0.291]	[0.249, 0.595]	[0.249, 0.295] (0.105, 0.467) (0.131, 0.435)
Bullying (95% CI) (90% CI)	[0.052, 0.054]	[0.052, 0.057]	[0.052, 0.095]	[0.052, 0.070] (0.028, 0.098) (0.033, 0.092)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: parent in prison, sex, siblings, siblings older, age, age squared, living in a rural area, and fixed effects for municipalities.

Table 6: **OLS Estimates: Effects of Life-Changing Events and Bullying on Whether Adolescents Dropped Out of School by Sex**

	Girls			Boys		
	(1)	(2)	(3)	(4)	(5)	(6)
Father Died	0.272*** (0.074)	0.234*** (0.075)	0.221*** (0.084)	0.248** (0.096)	0.237** (0.097)	0.195* (0.103)
Mother Died	0.300* (0.163)	0.365** (0.170)	0.289 (0.203)	0.093 (0.134)	0.146 (0.135)	0.117 (0.137)
Parent in Prison	0.051 (0.078)	0.061 (0.079)	-0.015 (0.090)	0.044 (0.075)	0.028 (0.075)	0.042 (0.079)
Bullying	0.091*** (0.020)	0.090*** (0.020)	0.083*** (0.021)	0.037*** (0.014)	0.034** (0.015)	0.040*** (0.015)
Siblings	0.036*** (0.010)	0.028*** (0.010)	0.039*** (0.011)	0.037*** (0.010)	0.030*** (0.011)	0.028** (0.011)
Siblings Older	0.002 (0.009)	0.005 (0.009)	-0.005 (0.010)	-0.001 (0.009)	0.002 (0.010)	-0.004 (0.010)
Age	-0.229 (0.462)	-0.158 (0.467)	-0.123 (0.485)	0.647 (0.456)	0.774* (0.459)	0.926* (0.478)
Age Squared	0.010 (0.016)	0.008 (0.016)	0.007 (0.017)	-0.020 (0.016)	-0.024 (0.016)	-0.030* (0.016)
Rural	0.066** (0.032)	0.097*** (0.037)	-0.009 (0.078)	0.044 (0.031)	0.051 (0.036)	-0.065 (0.076)
Constant	1.129 (3.329)	0.538 (3.366)	0.282 (3.501)	-5.142 (3.291)	-6.057* (3.312)	-6.968** (3.464)
State Fixed Effects	No	Yes	No	No	Yes	No
Municipality Fixed Effects	No	No	Yes	No	No	Yes
R^2	0.18	0.23	0.35	0.11	0.16	0.24
Observations	419	419	419	547	547	547

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

Standard errors in parentheses.

Table 7: **Bounding Methodology: Effects of Life-Changing Events and Bullying on Whether Adolescents Dropped Out of School (Girls)**

	(1)	(2)	(3)	(4)
Indepvar	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)	Krauth (2016)
		Panel 1 :		$0 \leq \delta \leq 1$
Father Died	[0.2715, 0.2717]	[0.2710, 0.2717]	[0.2682, 0.2717]	[0.2704, 0.2717]
(95% CI)				(0.057, 0.475)
(90% CI)				(0.091, 0.442)
Bullying	[0.0913, 0.0919]	[0.0913, 0.0929]	[0.0913, 0.1012]	[0.0854, 0.0913]
(95% CI)				(0.027, 0.133)
(90% CI)				(0.037, 0.126)
		Panel 2 :		$-1 \leq \delta \leq 0$
Father Died	[0.2717, 0.2719]	[0.2717, 0.2723]	[0.2717, 0.2751]	[0.2717, 0.2728]
(95% CI)				(0.068, 0.520)
(90% CI)				(0.100, 0.450)
Bullying	[0.0906, 0.0913]	[0.0896, 0.0913]	[0.0814, 0.0913]	[0.0913, 0.0959]
(95% CI)				(0.048, 0.155)
(90% CI)				(0.055, 0.145)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: parent in prison, sex, siblings, siblings older, age, age squared, living in a rural area, and fixed effects for municipalities.

Table 8: **Bounding Methodology: Effects of Life-Changing Events and Bullying on Whether Adolescents Dropped Out of School (Boys)**

	(1)	(2)	(3)	(4)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)	Krauth (2016)
		Panel 1 :		$0 \leq \lambda \leq 1$
Father Died	[0.224, 0.248]	[0.182, 0.248]	[-0.428, 0.248]	[0.144, 0.248]
(95% CI)				(-0.270, 0.472)
(90% CI)				(-0.195, 0.431)
Bullying	[0.034, 0.037]	[0.030, 0.037]	[-0.032, 0.037]	[0.013, 0.037]
(95% CI)				(-0.028, 0.064)
(90% CI)				(-0.019, 0.059)
		Panel 2 :		$-1 \leq \lambda \leq 0$
Father Died	[0.248, 0.272]	[0.248, 0.313]	[0.248, 0.923]	[0.248, 0.307]
(95% CI)				(0.021, 0.573)
(90% CI)				(0.031, 0.525)
Bullying	[0.037, 0.039]	[0.037, 0.044]	[0.037, 0.105]	[0.037, 0.057]
(95% CI)				(0.008, 0.092)
(90% CI)				(0.014, 0.085)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: parent in prison, sex, siblings, siblings older, age, age squared, living in a rural area, and fixed effects for municipalities.

Table 9: OLS Estimates: Effects of Life Events and Bullying on whether Adolescents are Neither Working Nor Studying

	Girls			Boys		
	(1)	(2)	(3)	(4)	(5)	(6)
Father Died	0.283*** (0.067)	0.239*** (0.069)	0.269*** (0.075)	0.030 (0.060)	0.058 (0.060)	0.031 (0.068)
Mother Died	0.369** (0.144)	0.431*** (0.151)	0.323* (0.179)	0.101 (0.077)	0.109 (0.077)	0.099 (0.082)
Parent in Prison	0.044 (0.071)	0.053 (0.073)	-0.037 (0.081)	0.068* (0.039)	0.075* (0.040)	0.069 (0.042)
Bullying	0.080*** (0.019)	0.076*** (0.019)	0.067*** (0.019)	0.022*** (0.008)	0.017** (0.008)	0.023*** (0.009)
Siblings	0.010 (0.010)	0.003 (0.010)	0.012 (0.010)	0.013** (0.005)	0.013** (0.006)	0.014** (0.006)
Siblings Older	0.007 (0.009)	0.009 (0.009)	-0.003 (0.009)	0.004 (0.005)	0.004 (0.005)	0.007 (0.006)
Age	-0.080 (0.417)	-0.020 (0.424)	-0.179 (0.437)	0.293 (0.244)	0.365 (0.244)	0.355 (0.264)
Age Squared	0.004 (0.014)	0.002 (0.015)	0.007 (0.015)	-0.010 (0.008)	-0.012 (0.008)	-0.012 (0.009)
Rural	0.030 (0.029)	0.056* (0.033)	-0.005 (0.069)	0.003 (0.017)	-0.005 (0.019)	-0.025 (0.040)
Constant	0.305 (3.005)	-0.208 (3.057)	1.020 (3.150)	-2.217 (1.757)	-2.765 (1.757)	-2.727 (1.908)
[1em] State Fixed Effects	No	Yes	No	No	Yes	No
Municipality Fixed Effects	No	No	Yes	No	No	Yes
R^2	0.13	0.18	0.34	0.05	0.12	0.15
Observations	400	400	400	467	467	467

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

Standard errors in parentheses

Table 10: **Bounding Methodology: Effects of Life Events and Bullying on whether Adolescents are Neither Working Nor Studying (Girls)**

	(1)	(2)	(3)	(4)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)	Krauth (2016)
		Panel 1 :		$0 \leq \delta \leq 1$
Father Died	[0.279, 0.283]	[0.274, 0.283]	[0.210, 0.283]	[0.283, 0.285]
(95% CI)				(0.073, 0.501)
(90% CI)				(0.107, 0.466)
Bullying	[0.080, 0.084]	[0.080, 0.090]	[0.080, 0.166]	[0.080, 0.095]
(95% CI)				(0.035, 0.145)
(90% CI)				(0.032, 0.128)
		Panel 2 :		$-1 \leq \delta \leq 0$
Father Died	[0.283, 0.286]	[0.283, 0.291]	[0.283, 0.355]	[0.280, 0.283]
(95% CI)				(0.031, 0.491)
(90% CI)				(0.071, 0.457)
Bullying	[0.076, 0.080]	[0.069, 0.080]	[-0.007, 0.080]	[0.066, 0.080]
(95% CI)				(0.009, 0.124)
(90% CI)				(0.019, 0.116)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: parent in prison, sex, siblings, siblings older, age, age squared, living in a rural area, and fixed effects for municipalities.

Table 11: **Bounding Methodology: Effects of Life Events and Bullying on whether Adolescents are Neither Working Nor Studying (Boys)**

	(1)	(2)	(3)	(4)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)	Krauth (2016)
		Panel 1 :		$0 \leq \delta \leq 1$
Bullying	[0.0225, 0.0227]	[0.0225, 0.0230]	[0.0225, 0.0374]	[0.0196, 0.0225]
(95% CI)				(-0.026, 0.046)
(90% CI)				(-0.018, 0.042)
		Panel 2 :		$-1 \leq \delta \leq 0$
Bullying	[0.0222, 0.0225]	[0.0219, 0.0225]	[0.0075, 0.0225]	[0.0225, 0.0241]
(95% CI)				(-0.001, 0.058)
(90% CI)				(0.002, 0.052)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: parent in prison, sex, siblings, siblings older, age, age squared, living in a rural area, and fixed effects for municipalities.

Table 12: **OLS Estimates: Effects of Life Events and Bullying on whether Adolescents are Working but not Attending School**

	Girls			Boys		
	(1)	(2)	(3)	(4)	(5)	(6)
Father Died	0.034 (0.058)	0.041 (0.060)	-0.006 (0.076)	0.250*** (0.095)	0.225** (0.096)	0.186* (0.101)
Mother Died	-0.044 (0.146)	-0.062 (0.161)	0.011 (0.168)	0.029 (0.137)	0.064 (0.137)	0.047 (0.139)
Parent in Prison	0.016 (0.054)	0.017 (0.057)	0.014 (0.062)	-0.004 (0.074)	-0.033 (0.074)	-0.028 (0.078)
Bullying	0.044*** (0.016)	0.051*** (0.017)	0.053*** (0.017)	0.025* (0.014)	0.026* (0.014)	0.029** (0.015)
Siblings	0.037*** (0.007)	0.035*** (0.007)	0.041*** (0.007)	0.029*** (0.010)	0.021** (0.010)	0.018* (0.011)
Siblings Older	-0.006 (0.006)	-0.007 (0.007)	-0.007 (0.007)	-0.003 (0.009)	-0.000 (0.009)	-0.009 (0.010)
Age	-0.265 (0.310)	-0.238 (0.318)	-0.008 (0.333)	0.445 (0.440)	0.538 (0.443)	0.702 (0.455)
Age Squared	0.011 (0.011)	0.010 (0.011)	0.002 (0.011)	-0.013 (0.015)	-0.016 (0.015)	-0.022 (0.016)
Rural	0.049** (0.021)	0.054** (0.025)	-0.007 (0.052)	0.045 (0.030)	0.058* (0.034)	-0.048 (0.073)
Constant	1.542 (2.230)	1.328 (2.287)	-0.402 (2.400)	-3.646 (3.172)	-4.285 (3.193)	-5.249 (3.296)
State Fixed Effects	No	Yes	No	No	Yes	No
Municipality Fixed Effects	No	No	Yes	No	No	Yes
R^2	0.15	0.19	0.28	0.09	0.15	0.24
Observations	379	379	379	531	531	531

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

Standard errors in parentheses

Table 13: **Oster’s Bounding Methodology: Effects of Life Events and Bullying on whether Adolescents are Working but not Attending School (Girls)**

	(1)	(2)	(3)	(4)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)	Krauth (2016)
	Panel 1 :		$0 \leq \delta \leq 1$	
Bullying	[0.041, 0.044]	[0.036, 0.044]	[-0.012, 0.044]	[0.017, 0.044]
(95% CI)				(-0.026, 0.084)
(90% CI)				(-0.017, 0.076)
	Panel 2 :		$-1 \leq \delta \leq 0$	
Bullying	[0.044, 0.047]	[0.044, 0.052]	[0.044, 0.100]	[0.044, 0.064]
(95% CI)				(0.001, 0.129)
(90% CI)				(0.009, 0.117)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: parent in prison, sex, siblings, siblings older, age, age squared, living in a rural area, and fixed effects for municipalities.

Table 14: OLS Estimates: Effects of the Death of a Father on Psychological Variables

Dependent	Girls			Boys		
	Self-esteem (1)	Locus (2)	Stress (3)	Self-esteem (4)	Locus (5)	Stress (6)
Father Died	-0.132 (0.267)	-0.310 (0.244)	0.025 (0.262)	-0.030 (0.285)	0.110 (0.286)	0.265 (0.280)
Mother Died	0.420 (0.649)	-0.043 (0.593)	-0.560 (0.638)	-0.803** (0.379)	-0.991*** (0.380)	0.144 (0.372)
Parent in Prison	0.047 (0.287)	0.008 (0.262)	0.273 (0.282)	0.052 (0.218)	-0.124 (0.219)	0.207 (0.214)
Bullying	-0.122* (0.067)	-0.182*** (0.061)	0.312*** (0.066)	-0.173*** (0.041)	-0.180*** (0.041)	0.290*** (0.041)
Siblings	-0.044 (0.034)	-0.025 (0.031)	-0.010 (0.033)	-0.032 (0.031)	-0.053* (0.031)	0.054* (0.030)
Siblings Older	0.055* (0.032)	-0.033 (0.029)	-0.029 (0.031)	0.006 (0.029)	-0.027 (0.029)	0.014 (0.028)
Age	0.321 (1.546)	1.819 (1.414)	-1.622 (1.520)	-1.482 (1.319)	-3.060** (1.321)	0.219 (1.293)
Age Squared	-0.009 (0.053)	-0.058 (0.049)	0.055 (0.052)	0.053 (0.046)	0.110** (0.046)	-0.008 (0.045)
Rural	-0.267 (0.250)	-0.281 (0.229)	-0.122 (0.246)	0.175 (0.209)	-0.156 (0.210)	0.158 (0.205)
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.20	0.24	0.24	0.16	0.19	0.22
Observations	419	419	419	546	547	547

Standard errors in parentheses.

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

9 Appendix

Table A1: **Latent Variable Scales**

Scale Name	Scale Survey Question	Factor Loadings
Bullying Eigenvalue: 2.9	[1] Other students bother me (pulling hair, throwing objects, etc.)	0.3948
	[2] Other students called me bad names	0.4499
	[3] Other students left me out of an activity intentionally	0.4596
	[4] Other students threatened to hurt me	0.4686
	[5] I was beaten or kicked	0.4592
Self-esteem Eigenvalue: 2.1	[1] I am satisfied with myself	0.3678
	[2] I am able to do things as well as others	0.4358
	[3] I am a worthy person	0.4845
	[4] I have good qualities	0.4720
	[5] I have a positive attitude toward myself	0.4661
Authoritative Parents Eigenvalue: 2.8	[1] My parents make show me how much they love me	0.4651
	[2] My parents explain to me the consequences of my misconduct	0.4444
	[3] My parents encourage me to say what I feel when I disagree	0.4443
	[4] My parents reason with me when I misbehave	0.4441
	[5] My parents know my concerns	0.4400
Family Support Eigenvalue: 3.5	[1] My family recognizes what I do well	0.4295
	[2] My family really tries to help me	0.4593
	[3] My family helps me make decisions	0.4449
	[4] My family supports me when I need them	0.4648
	[5] My family is affectionate with me	0.4365

Table A2: OLS Estimates: Effects of Life Events and Bullying on whether Adolescents Dropped Out of School

	(OLS)	(Probit)	(Logit)
Father Died	0.203*** (0.062)	0.670*** (0.257)	1.138** (0.442)
Mother Died	0.176* (0.107)	0.861* (0.473)	1.587** (0.801)
Parent in Prison	0.014 (0.057)	0.100 (0.294)	0.146 (0.530)
Bullying	0.048*** (0.012)	0.212*** (0.054)	0.384*** (0.094)
Sex (Female=1)	-0.019 (0.023)	-0.085 (0.124)	-0.104 (0.224)
Siblings	0.029*** (0.007)	0.131*** (0.036)	0.243*** (0.065)
Siblings Older	-0.003 (0.007)	-0.008 (0.036)	-0.012 (0.063)
Age	0.435 (0.328)	4.411** (1.849)	9.344*** (3.444)
Age Squared	-0.012 (0.011)	-0.138** (0.063)	-0.295** (0.117)
Constant	-3.606 (2.370)	-36.359*** (13.514)	-75.857*** (25.260)
Municipality Fixed Effects	Yes	Yes	Yes
R^2	0.23		
Observations	966	859	859

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

Standard errors in parentheses.