Are Parents Who Smoke Responsible for Childhood Obesity in Mexico?

June 25, 2018

Abstract

Mexico is in the top ten of countries with highest number of children with overweight. The main strategy to combat the overweigh epidemic has emphasized healthy exercise and consumption. Yet, little attention has been given to environment factors such as smoking by parents. To understand the effect of parents who smoke on child obesity, we use a rich data set for adolescents between 12 and 18 years old from families living in urban areas in Mexico. We find that exposure to parents who smoke increases the probability of being overweight by 8 percentage points. Two-stage least squares (2SLS) estimation and two recent bounding techniques developed by Oster (2016) and Krauth (2016) confirm this relationship, suggesting that our results are not driven by omitted variables. Policies intended to attack the problem of child obesity should not only concentrate on risk factors such as diet and exercise, but also need to incorporate the environment where the children are living.

JEL Classification:I12, I15, D19

Keywords: overweight, obesity, adolescents, second-hand smokers

1 Introduction

Adolescents overweight is present in 36% of adolescents living in Mexico between the ages of 12 and 19 years old (ENSANUT, 2016). The government's main strategy to tackle the obesity epidemic focuses on the benefits of exercising and having a healthy diet.[1] Yet, this strategy has not taken into account factors on the environment that can affect the levels of child obesity. For example, an emerging hypothesis suggests that environmental exposures to chemicals, such as secondhand smoke, may play a role in the onset of childhood obesity (Thayer et al. 2012). To test this hypothesis, Thatcher, et al. (2014) exposed mice to secondhand smoke and the mice gained weight. They observed that secondhand smoking triggered ceramide, a small lipid that disrupts cell function, which makes the body insulin-resistant hindering balance sugar levels in the blood, and generating an increase on weight.

Recent evidence has found a positive relationship between parents who smoke and obese children; yet, these results could be biased due to ommited variables. Moore et al. (2016), using data from American adolescents between 6 and 19 years old from the National Health and Nutrition Examination Survey and using a multinomial regression model[2], find that exposure to secondhand smoke increases the risks of child obesity. McConell, et al. (2016), using data from southern California children in the US and a multilevel modeling strategy, find that exposure to tobacco smoke and air pollution contribute to child obesity. Davis, et al. (2016), using a sample of 222 children between 7 and 11 years old near Augusta, Georgia and using ANCOVA models[3], find that having parents who smoke is associated with fatness and poorer cognition in children. Although these studies control for a significant number of variables, it is possible that the results are biased due to a problem of omitted variables. Another important aspect to consider is that these studies have been mainly developed in the United States, so it could be the case that the results are not robust for other countries such as Mexico.

This paper analyzes the effects of parents who smoke on overweight and obesity for adolescents between 12 and 18 years old living in urban areas in Mexico. Ordinary Least Squares show that exposure to parents who smoke increases the probability of being overweight (including obesity) by 8 percentage points. To assess the problem of omitted variable bias, we use an instrumental variable strategy based on Lewbel (2012) and two recently developed bounding methodologies developed by Oster (2016) and Krauth (2016). The bounding methodologies assume that adding observed control variables is informative about the bias due to unobservable variables, and based on this assumption, conditions for bounds and identification are provided. Using these methodologies, we confirm that having a parent who smokes affects adolescents overweight (including obesity). When differentiate by gender, we find that our results are robust for girls, but not for boys.

[1] In particular the Mexican government has implemented the campaign: CHECATE, MIDETE y MUEVETE. This campaign try to make aware about the problem of obesity paying attention to three factors: attending a health clinic (CHECATE), reduce the consumption of fat and sugars (MIDETE), and to do exercise (MUEVETE).

[2] They control for income, family size, and adolescent being physically active.

[3] They control for race, sex, age, and parent education

This paper contributes to a scarcity, but increasing literature showing that to attack child obesity cannot be explained only by risk factors such as diet or low physical activity, but that the environment matters. Different to the previous literature, we use a bounding methodology and instrumental variables to handle with the problem of omitted variables showing that our results are robust.

The rest of the paper is organized as follows: Section 2 reviews the related literature; Section 3 introduces the data and the empirical strategy; Section 4 presents the results; and Section 5 concludes.

2 Literature Review

The causes of obesity are complicated, but the literature has paid special attention to behavioral factors, such as poor eating habits, use of technology, and lack of exercise. Janssen et al. (2005) found that within most countries physical activity levels were lower and television viewing times were higher in overweight compared to normal weight youth. In addition, they found that in 91% of the countries examined, the frequency of sweets intake was lower in overweight than normal weight youth.

Another group of papers analyzes the relationship between psychological factors and obesity. Terraciano et al. (2009), using data from Italy, found that low conscientiousness and high levels of impulsiveness were associated with obesity and abdominal adiposity, respectively. Baldwin et al. (2016), using data from twins born in England and Wales, found that bullied children were more likely to be overweight than non-bullied children at age 18.

Other factors that seem to be linked to obesity is the type of income that families receive. For example, Leroy et al. (2010), using data from Mexico, found that cash and in-kind transfers increase the consumption of fruits and vegetables, but also lead to excess energy consumption. Damon and Kristiansen (2010) estimated the effect of migration from Mexico to the United States on obesity for children who remain in Mexico. They found that boys are more likely to become obese than girls when a household member migrates.

Yet, few papers has analyzed factors on the environment that can affect child obesity, such as, parents who smoke. Apfelbacher et al. (2008), using a cross-sectional data for children between five to seven years old living in Germany, found that parents who smoke was an important predictor for being overweight and obese. Kwok et al. (2010), using data from children between 7 and 11 years old living in Hong Kong, found that exposure to second hand smoking increased the Body Mass Index of the children. Moore et al. (2016), using data from American adolescents between 6 and 19 years old from the National Health and Nutrition Examination Survey, find that exposure to secondhand smoke increase the risks of child obesity.

What are the mechanisms that explain why being exposed to parents who smoke increases the risks of childhood obesity? One potential mechanism is that secondhand smoke exposure affects the respiratory system of the children increasing their risks of asthma and pneumonia, and as a consequence reducing the childs ability to do exercise (Vitória et al., 2017). Other authors point out that spending on tobacco has effects on food consumption and therefore on children's health. Bush et al. (2014), using data from the National Longitudinal Survey of Youth-79 Child surveys, found that higher cigarette prices increase BMI in the children of smoking mothers. This suggest, that smokers - to buy their cigars - substitute healthier foods for cheaper and less healthy foods, generating an increase of weight of their children. Finally, there is an emerging literature that suggest that the effects of chemicals contained on cigarettes affect directly the levels of obesity. Thatcher et al. (2014) exposed mice to cigarette smoke and observed how they reacted to the smoke. By analyzing their metabolic functions when exposed to smoke the mice gained weight.

3 Data

To analyze the effects of parents who smoke on child obesity, we use a database that was developed in 2015 to analyze factors that influence social mobility in Mexico in urban areas: Mexican Social Mobility Survey 2015 (EMOVI-2015). The survey is representative of urban areas in Mexico. It contains detailed information regarding education, labor, family, and non-cognitive skills for one of the parents living in the household and for one adolescent between 12 and 18 years old. The survey collected information for 2,616 households.

The data contains information about self-reported height and weight for adolescents and their parents. In addition, it contains the measures reported by the interviewed regarding these outcomes. In this paper, we use for weight and height the average reported by the interviewee and the interviewer. Then we use the tables proposed by the World Health Organization to calculate the Body Mass Index for adolescents and adults. Finally, we construct a dummy variable that classifies the individual being overweight (including obesity) or not. We find that 33% of adolescents are overweight, being 29% for girls and 38% for boys. In the case of the adults, 70% are classified as overweight, and we do not observe differences by gender (see Table 1). Regarding smoking, the survey contains the following question for adults: during the last two weeks, have you smoked a cigarette? 23% of adults reported yes to this question (see Table 1).

Regarding physical activity, 62% of adolescents reported doing physical activity in the previous two weeks. This percentage is higher for boys (71%) than for girls (54%). The data also contains information regarding adolescents personality. Using principal components, we develop indexes for the following variables: self-control, extraversion, openness, conscientiousness, agreeableness, and neuroticism. In general, we do not observe important differences with the exception of neuroticism: -0.20 standard deviation for girls and .20 standard deviation for boys (see Table 1). In addition, we include a question that is a proxy for being bullied: in your school, have you observed teasing between classmates? 65% of adoles-

cents reported yes to this question, and we do not observe differences by gender (see Table 1).

The data also contains information regarding the use of time. These variables are measure in minutes and we standardized them. It appears that girls spend more time studying, and boys spend more time with friends and watching TV (see Table 1). In addition, Table 1 reports information regarding rooms, source of income and possession of assets. In average, the number of rooms per household is 3.79. Regarding source of income, we observed that 16% of the households receive transfers for the social program PROGRESA, 10% for other social programs, 3% remittances, 3% transfers for family inside the country, and 3% receive income for rents. Finally, we decided to generate an index for durable goods related to entertainment using principal components analysis. The index for durable goods related to entertainment was built using information for the possession of internet, pay TV, TV, cell phone, car, and computer. We do not observe important difference between the exposure to durable goods of entertainment between girls and boys.

4 Estimation Strategy

4.1 Identification Strategy

This paper analyzes the effects of secondhand smoking on the probability of adolescent's being overweight. The model to estimate is given by:

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

where Y is the outcome of interest (a dummy variable indicating whether an adolescent is overweight), T is the variable of interest (one parent smoke), X is a vector of observed control variables, and e is an error term with mean zero.

A study of this type presents several econometric challenges. First, the measure of a "parent who smoke" is a proxy variable, and it only takes the value of one when the parent that answer the survey reported smoking cigarettes. So, there is a potential problem of measurement error. Second, this variable may be correlated with other psychological variables not present in the data. If such variables are correlated with the outcome of interest, then they are in the error term e and their correlation with T will generate bias in the estimated impacts of secondhand smoking. Finally, reverse causality is likely to be minimal, i.e. it is not clear why childhood obesity can be a factor that affects the parents consumption of cigarettes.

To address the problem of omitted variable bias, we use a recently developed bounding methodology developed by 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 (Altonji et al., 2005). If such additions do not affect the coefficient of interest, then this coefficient can be considered to be reliable. This strategy implicitly assumes that selec-

tion on observables is informative about selection on unobservables. Oster (2016) formalize this idea, and provides conditions for bounds and identification. Following the notation in Oster (2016), the full model has the form:

Y= β T+ X_1 + X_2 +ϵ.

where T is the variable of interest, X_1 contains the *observed* control variables multiplied by their coefficients, i.e. $X_1 = \sum_{j=1}^{J_o} x_j^o \gamma_j^o$, and X_2 contains all *unobserved* variables multiplied by their coefficients, i.e. $X_2 = \sum_{j=1}^{J_u} x_j^u \gamma_j^u$. Finally, ϵ is a random error that represents measurement error in Y and is uncorrelated with X_1, X_2, and T. Oster (2016) suggests the following approach to account for omitted variable bias:

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

(2) Regress Y on T and X_1, and report the parameter on T, denoted by $\tilde{\beta}$, and the R-squared coefficient, denoted by $\tilde{R}$.

(3) 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 (T, X_1) and unobservables (X_2). Also, define δ to be a parameter that ensures the equality $\frac{Cov(T,X_2)}{Var(X_2)} = \delta \frac{Cov(T,X_1)}{Var(X_1)}$. In other words, this relationship formalizes the idea that the magnitude and sign of the relationship between T and X_1 provides some information about the magnitude and sign of the relationship between T and X_2.[4] Oster (2016) shows that $\beta^* = \tilde{\beta} - \delta \frac{(\beta^0 - \tilde{\beta})(R_{max} - \tilde{R})}{(\tilde{R} - R^0)}$ is a consistent estimator of the effect of T 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.[5] 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, we 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: $0 \leq \delta \leq 1$.[6] This allows one to construct the set [$\tilde{\beta}$, β^*] for different values of δ and R_{max}. 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 Osters bounding methodology is that it provides an intuitive way to arrive

[4]For example, if $-1 \leq \delta \leq 1$, then the variable of interest (T) is no more correlated with unobservables (X_2) than it is correlated with observables (X_1). The case $0 \leq \delta \leq 1$ has a similar interpretation, with the additional assumption that the relationship between T and X_1 have the same sign as the relationship between T and X_2.

[5]The 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.

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

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. Krauths bounding methodology, while more complex has two advantages over Osters methodology. First, it requires information only about δ. Second, it provides inference about the bounding based on Imbens and Manski (2004) confidence intervals. Krauths methodology proceeds using the following model:

Y= Y(T)= β_TT + U

Let $U^P = X_1\beta_{X_1}$ be the best linear predictor of U given X_1 (a group of control variables):
$\beta_{X_1} = E(X_1'X_1)E(X_1'Y) - \beta_T E(X_1'X_1)E(X_1'T)$

Thus:
Y=β_TT + $X_1\beta_{X_1}$ + ϵ, where $E(X_1'\,\epsilon) = 0$

Krauth specifies δ such that:

$\frac{Cov(T,\epsilon)}{\sqrt{Var(\epsilon)}} = \delta\frac{Cov(T,X_1\beta_{X_1})}{\sqrt{Var(X_1\beta_{X_1})}}$

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

Notice that δ can be rewritten as:

$\delta(\beta_T) = \frac{corr(T,\epsilon)}{corr(T,X_1\beta_{X_1})} = \frac{corr(T,Y-\beta_T T-X_1\beta_{X_1}(\beta_T))}{corr(T,X_1\beta_{X_1}(\beta_T))}$

Then, Krauth shows the following properties of $\delta(\beta_T)$:

i. $\delta(\beta_T)$ exists and is differentiable for all $\beta_T \neq \beta^\infty$ (the value of β_T at which $corr(T, X_1\beta_{X_1}(\beta_T)) = 0$).

ii. There is a $\delta^\infty = lim_{\beta_T\to\infty}\delta(\beta_T) = lim_{\beta_T\to-\infty}\delta(\beta_T)$ and $\delta^\infty \geq 0$, i.e. the limit as β_T approaches positive or negative infinity is δ^∞.

iii. Notice that from i and ii, $\delta(\beta_T)$ takes the form of a hyperbolic funtion. Thus, if given the relative correlation restriction $\Delta = [\delta^L, \delta^H]$, the bounds $[\beta_T^L, \beta_T^H]$ can be found by inverting $\delta(\beta_T)$.

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.

Finally to check the robustness of our results we use the methodology proposed by Lewbel (2012). Assuming the following model:

Y= β_1 T + γ_1 X + e_1 ; and

$T = \gamma_2 X + e_2$

And, assuming the presence of heteroskedasticity in the second equation, Lewbel (2012) shows that β_1 can be consistently estimated using $(Z - \bar{Z})\hat{\epsilon_2}$ as instrument, where Z is all the regressors in X except the constant and $\hat{\epsilon_2}$ are the estimated residuals from the second equation.

5 Results

5.1 Principal Results

To analyze the effects of parents who smoke on the probability of being overweight, we first present the results using an OLS regression, and then we check the robustness of our results using the bounding methodology proposed by Oster (2016) and Krauth (2016). In addition, we use an instrumental variable strategy using the methodology proposed by Lewbel (2012)

Table 1 column 1, presents a linear probability model (OLS regression) of the impact of exposure to a one parent who smokes on the probability of adolescents overweight (including obesity). We control for sex, age, self-control, a proxy for bullying at the school level (teasing between classmates at school), and municipality fixed effects. The results show that when a parent smokes cigarettes increases the probability of adolescents being overweight by 8.5 percentage points.

One strategy to verify how robust are our results to the problem of omitted variables is to include controls and analyze the stability of the parameter of interest. In column 2, we included variables regarding the use of time by the adolescents. In particular the variables included are: time studying, time sleeping, time with friends, and time watching TV. After including these variables, the coefficient associated with parent smoking decreased from 8.5 to 7.9 percentage points, but it continues being statistically significant. In column 3 we included variables related to personality. The data contains information regarding extraversion, agreeableness, conscientiousness, neuroticism, and openness. After including the controls regarding the big-five personality factors, the coefficient associated with a parent who smokes remained at 7.6 percentage points.

Other important factors that should be considered are those related with family income and the possession of assets. There are some evidence that receiving money from social programs (Leroy et al., 2010) or receiving remittances (Damon and Kristiansen, 2010) are important factors that influence the level of adolescents obesity. In addition, there are other research that found important relationship between assets related to entertainment and obesity (Janssen et al., 2005). In column 4, we include information regarding transfers from PROGRESA, transfers for other social programs, remittances, transfers for family, and rents. It also includes: number of rooms, and an index of durable goods regarding enter-

tainment. After including these controls it is observed a small increase in the coefficient associated with parent smoke from 7.6 to 7.8 percentage points.

Oster (2016) shows that just adding controls, which is a common strategy to verify the robustness of the results, is not enough to avoid omitted variable bias. Although our database contains a large number of controls, it is possible that important variables are being omitted. In particular, the diet consumed by adolescents. It is possible that parents who smoke cigarettes sacrifice money for healthy food. Therefore, not controlling for the quality of diet can generate bias in our results.

Table 3 presents results using Osters methodology to analyze the robustness of the results in Table 2. Panel A presents the results under the assumption that $0 \leq \delta \leq 1$, i.e. assuming that the relationship between the variable of interest and the (aggregated) controls has the same sign as the relationship between the variable of interest and the (aggregated) unobservables. Column 1 estimates bounds using the value of the R_{max} proposed by Oster (2016), which yields a very tight bounds estimate of [0.078, 0.079]. To check the robustness of this estimate of the bounds, we estimate bounds using the R_{max} proposed by Gonzalez and Miguel (2015) in Column 2. The bounding estimated is: [0.078, 0.081]. To further check the robustness of the results, we use the extreme value that $R_{max} = 1$, which yields a bounding estimate of [0.078, 0.101] in column 3.

Panel B presents the results when $-1 \leq \delta \leq 0$.[7] Using the R_{max} proposed by Oster, the bounding estimated again is very tight: [0.077, 0.078]. Using the R_{max} proposed by Gonzalez and Miguel, the bounding is: [0.075, 0.078]. Finally, using a conservative $R_{max} = 1$, the bound is: [0.055, 0.078]. To sum up, the effect of parental smoking on adolescents overweight is robust when Osters bounding methodology is used.

Table A1, column 1, presents analogous results using Krauths methodology Assuming that $-1 \leq \delta \leq 1$, the bounding associated with parents who smoke is [0.049, 0.092]. The 95% confidence interval associated with this estimate is (-0.005,0.144); yet, the 90% confidence interval is (0.006, 0.133). Thus at the 90% we can reject the hypothesis of no effects of parents who smoke on child obesity. To better confirm this result, Table A3, column 1, presents the effects of parents who smoke using the instrumental variable proposed by Lewbel (2012). The results show that, when using this instrument, when a parent smokes cigarettes increases the probability of adolescents being overweight by 8.3 percentage points. Thus, the results using Krauths and Lewbels methodologies confirm the results based on Osters methodology, regarding the robustness of parents who smoke to the problem of omitted variable bias when analyzing its effects on childrens overweight.

[7] The case $-1 \leq \delta \leq 0$ assumes that the relationship between T and X_1 has different sign than the relationship between T and X_2.

5.2 Heterogeneous Effects

Is there any difference on the effect of parents who smoke on adolescents overweight based on gender? Table 4 reproduces the results presented in Table 2, but differentiates between girls (columns 1 to 3) and boys (columns 4 to 6). For girls, the results show that the coefficient associated with parents who smoke is statistically significant (see column 1). This result is maintained when variables for personality (column 2) and income and assets (column 3) are included. In particular, it is observed that when one of the parents smokes cigarettes increases the probability of girls being overweight by 8.6 percentage points. For boys, the effect of parents who smoke is statistically significant (see column 4), and this result is maintained when variables for personality (column 5) and income and assets (column 6) are included. Yet, the size of the impact for boys is smaller than for girls. When a parent smoke increases the probability of boys being overweight by 7.5 percentage points.

To analyze the robustness of the effects of second hand smoking on girls probability of being overweight, we apply Osters methodology and the results are presented in Table 5. Panel A presents the results when $0 \leq \delta \leq 1$. Column 1 use the R_{max} proposed by Oster, the bound on the effect of parents who smoke is [0.084, 0.086]. Using the R_{max} proposed by Gonzalez and Miguel (2015), the bound is [0.079, 0.086]. Finally, using a conservative $R_{max} = 1$, the bound estimated is [0.044, 0.086]. Assuming $-1 \leq \delta \leq 0$, the effects of secondhand smoking on the probability of being overweight is presented in Panel B. Using the R_{max} proposed by Oster, the bound estimated is [0.086, 0.089]. Using the R_{max} proposed by Gonzalez and Miguel (2015), the bound is [0.086, 0.094]. Finally, using a conservative $R_{max} = 1$, the bound estimated has a range of [0.086, 0.128]. Thus, secondhand smoking is robust to the problem of omitted variables for different assumptions using Osters methodology.

Table A1, column 2, presents the results using Krauths methodology. Under the assumption that $-1 \leq \delta \leq 1$, the bound is [0.075, 0.111]. The 95% confidence interval is given by (-0.011, 0.191), and at the 90% it is given by (0.005, 0.176). In addition, Table A3, column 2, presents the results using Lewbels methodology. In this case, the coefficient associated to parents who smoke is .077 and it is statistically significant.

To analyze the robustness of the results for the case of boys, I again apply Osters methodology. The results are presented in Table 6. When $0 \leq \delta \leq 1$ and we use the R_{max} proposed by Oster (2016), the bound is [0.075, 0.081]. The results are robust when the R_{max} proposed by Gonzalez and Miguel (2015) is used: [0.075, 0.095]. And, when we use a extreme value of $R_{max} = 1$, the bound estimated is: [0.075, 0.186]. When we assume $-1 \leq \delta \leq 0$ and the R_{max} proposed by Oster (2016), the bound is [0.069, 0.075]. The results are robust when the R_{max} proposed by Gonzalez and Miguel (2015) is used: [0.055, 0.075]; yet, the results are not robust when we assume $R_{max} = 1$, obtaining a bound estimated of: [-0.036, 0.075]. This result is confirmed when using Krauths methodology (see Table A1, column 3). In particular, the bound is given by [0.038, 0.079], the confidence interval at the 95% is given by (-0.038, 0,155), and the confidence interval at the 90% is given by (-0.022, 0.140). Finally, we present the results using Lewbels methodology in Table A3, column 3. The coefficient associated with parents who smoke is 0.050; yet, it is not statistically significant. These

results suggest that girls, but not boys, have more chances of being overweight when one of their parents smoke.

Another aspect that we analyze is the effect depending on age. Table 7 presents the results for children between 12 and 15 years old (columns 1 to 3), and children between 16 and 18 years old (column 4 to 6). For children between 12 and 15 years old, the coefficient associated with parents who smoke is statistically significant regardless the controls used. It is observed that when one of the parents smoke increase the probability of these children of being overweight by 9.7 percentage points. For children between 16 and 18 years old, the effect of parents who smoke is statistically significant (see column 4), and this result is maintained when variables for personality (column 5) and income and assets (column 6) are included. Yet, in this last case, the coefficient is statistically significant at the 10% level and as a consequence its confidence interval includes the zero.

Table 8, presents the results using Osters methodology to check the robustness of the results for children between 12 and 15 years old. Using different assumptions regarding δ and R_{max}, the bounds do not include the zero. The only exception is when we assume $-1 \leq \delta \leq 0$ and $R_{max} = 1$, in which case the bound is given by [-0.054, 0,097]. Yet, we should notice that this is an extreme case. Table A2 present the results using Krauths methodology. The bound is given by [0.069, 0.105], the 95% confidence interval is given by (-0.001, 0190), and the 90% confidence interval is given by (0.011, 0.174). Finally, using the instrumental variable proposed by Lewbel, we find that the coefficient associated with parents who smoke is 0.083, and it is statistically significant (see Table A3, column 4). These results suggest that younger children are more affected when facing a parent who smokes.

5.3 Mechanisms

The previous results confirm that parents who smoke increase the probability of children obesity. In terms of mechanisms there are three potential mechanisms who were analyzed in the literature review section: (1) exposure to secondhand smoke affects the ability of children to do exercise; (2) smokers buy less healthy foods and it has consequences for child obesity; and (3) the chemicals contained on cigarettes affect directly the levels of overweight.

Table 9, column 2, presents results analyzing the first mechanism. When the variable of physical activity is incorporated, the coefficient associated with parents who smoke increase from 7.8 to 8.0 percentage points and continue being statistically significant. Thus, at least for the case of urban areas in Mexico, it appears that the mechanism is not trough physical activity.

Regarding the second mechanism, we do not have information regarding the diet and products consumed within the household. One potential approach is to assume that parents who smoke also consume less healthy food and as a consequence they also suffer from obesity. Thus including parents obesity can be a proxy for consumption of unhealthy food within the household. Table 9, column 3 incorporates a dummy variable for adults being overweight or

obese, and we do not observe any change in the coefficient associated with parents who smoke.

5.4 Discussion

This paper present evidence regarding the effects of parents who smoke on children overweight (including obesity). This result is robust when using different methodologies suggesting that this is not just a consequence of omitted variable bias. Yet, one important limitation is that we only have information for one of the parents who smoke. Another important limitation is that we do not have information about the intensity of smoking, i.e. the number of cigarettes consumed.

Another important aspect that should be analyzed for feature research is to clarify the mechanisms trough parents who smoke affects the levels of child obesity. In this paper, we document that the channel is not trough the ability of the children of doing exercise. Yet, one potential channel that should be analyzed in the future is related to how the prices of cigarettes affect the purchase of healthy food. If this is the potential channel, the policy makers need to be careful when incorporating taxes on cigarettes. The same situation applies if the mechanism is due to the chemicals contained in the cigarettes. In this case, the policy makers need to be careful when smoking is prohibited in public spaces, because it can increase the consumption of cigarettes within the household.

6 Conclusion

This paper analyzes the effects of parents who smoke on childhood obesity in Mexico. We find that having a parent that smokes, increases the probability of being overweight by 8 percentage points for adolescents between 12 and 18 years old living in urban areas in Mexico. This paper contributes to an increasing, but scarce, literature that shows evidence from the effects of having at least one parent that smoke on child obesity. Yet, most of this literature suffers from the problem of omitted variable bias. In order to handle with this problem, we use two bounding methodologies developed by Oster (2016) and Krauth (2016). In addition, we implement an instrumental variable strategy proposed by Lewbel (2012). Using these methodologies, we find that our results are robust to the problem of omitted variable bias.

Mexico has implemented two important policies to reduce the consumption of tobacco: (1) increasing tobacco taxes, and (2) creating smoke free-environments. Yet, little information exists regarding the effect of these policies on the health of children. On the one hand, it is possible that these policies reduce adult consumption of cigarettes and as a consequence the children are less exposed to second-hand smoking. On the other hand, these policies may have negative consequences: (1) it is possible that adults shift their consumption from public spaces to smoke at home which can be more harmful for children exposed to secondhand smoke; and (2) it is possible that the increase in prices may encourage the consumption of illegal cigarettes which can be more harmful for low-income individuals. Our results present evidence that having a parent who smokes affects the level of child obesity, and as a conse-

quence policymakers should take into account this channel when set up policies to reduce the consumption of tobacco.

7 References

Altonji, J., T. Elder, and C. Taber (2005). "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools". *Journal of Political Economy*, 113(1), pp. 151-184.

Apfelbacher, C., A. Loerbroks, J. Cairns J, H. Behrendt, J. Ring, and U. Krmer (2008). "Predictors of Overweight and Obesity in Five to Seven-Year-Old Children in Germany: Results from Cross-Sectional Studies." *BMC Public Health*. 8:171

Baldwin, Jessi, Louise Arseneault, Candice Odgers, Daniel Belsky, Timothy Matthews, Antony Ambler, Avshalom Caspi, Terrie Moffitt, and Andrea Danese (2016). "Childhood Bullying Victimization and Overweight in Young Adulthood: A Cohort Study." *Psychosomatic Medicine*. 78(9):1094-1103.

Busch, S, M. Jofre-Bonet, T. Falba, amd J. Sindelar (2004). "Burning a Hole in the Budget: Tobacco Spending and its Crowd-Out of Other Goods." *Applied Health Economics and Health Policy*. 3: 263272.

Damon, Amy and Devon Kristiansen (2014). "Childhood Obesity in Mexico: The Effect of International Migration." *Agricultural Economics*. 45(2014): 711-727.

Davis, C., M. Tingen, J. Jia, F. Sherman, C. Williams, K. Bhavsar, N. Wood, J. Kobleur, and J. Waller (2016). "Passive Smoke Exposure and Its Effects on Cognition, Sleep, and Health Outcomes in Overweight and Obese Children." *Childhood Obesity*. 12: 119-125.

ENSANUT (2016). "Encuesta Nacional de Salud y Nutrición de Medio Camino 2016." Instituto Nacional de Salud Pública, México.

Janssen, I., P. Katzmarzyk, W. Boyce, C. Vereecken, C. Mulvihill, C. Roberts, C. Currie,and W. Pickett (2005). "Comparison of Overweight and Obesity Prevalence in School-Aged Youth from 34 countries and their Relationships with Physical Activity and Dietary Patterns. *Obesity review*, 6 (2): 123132.

Kwok, M., C. Schooling, T. Lam, and G. Leung (2010). "Paternal Smoking and Childhood Overweight: Evidence from the Hong Kong Children of 1997. *Pediatrics*, 126 (91):4656.

Leroy, Jef, Paola Gadsden, Sonia Rodríguez-Ramírez, and Teresa González de Cossío (2010). "Cash and In-Kind Transfers in Poor Rural Communities in Mexico Increase Household Fruit, Vegetable, and Micronutrient Consumption but Also Lead to Excess Energy

Consumption." *The Journal of Nutrition*, 140(3):612-617.

McConnell, R., E. Shen, F. Gilliland, M. Jerrett, C. Chang, F. Lurmann, and K. Berhane (2015). "A Longitudinal Cohort Study of Body Mass Index and Childhood Exposure to Secondhand Tobacco Smoke and Air Pollution: the Southern California Childrens Health Study." *Environ Halth Perspect*. 123:360-366.

Moore, B. , M. Clark, A. Bachand, S. Reynolds, T. Nelson, and J. Peel (2016). "Interactions Between Diet and Exposure to Secondhand Smoke on the Prevalence of Childhood Obesity: Results from NHANES, 20072010." *Environ Halth Perspect*. 124:1316-1322.

Oster, E. (2014). "Unobservable Selection and Coefficients Stability: Theory and Evidence." Brown University and NBER.

Terraciano, Antonio, Angelina Sutin, Robert McCrae, Barbara Deiana, Luigi Ferrucci, David Schlessinger, Manuela Uda, and Paul Costa (2009). "Facets of Personality Linked to Underweight and Overweight." *Psychosomatic Medicine*. 71(6): 682-689.

Thatcher, M., T. Tippetts, M. Nelson, A. Swensen, D. Winden, M. Hansen,M. Anderson, I. Johnson, J. Porter, J. Prince,P. Reynolds, and B. Bikman (2014). "Ceramides mediate cigarette smoke-induced metabolic disruption in mice." *American Journal of Physiology: Endocrinology and Metabolism*, 307(10):19-27.

Thayer, K., J. Heindel, J. Bucher, and M. Gallo (2012). "Role of environmental chemicals in diabetes and obesity: a National Toxicology Program workshop review." *Environ Health Perspect*, 120: 779 789.

Vitória, P., C. Nunes, and J. Precioso (2006). "Parents' Educational Level and Second-Hand Tobacco Smoke Exposure at Home in a Sample of Portuguese Children." *Rev Port Pneumol*, 23(4):221-224.

8 Tables

Table 1: **Basic Descriptive Statistics**

	Total	Girls	Boys
Sex: Boys=1, Girls=0	0.49	0.00	1.00
	(0.50)	(0.00)	(0.00)
Age	14.80	14.82	14.78
	(2.11)	(2.10)	(2.12)
Adolesecents Overweight or Obese: Y=1, N=0	0.33	0.29	0.38
	(0.47)	(0.45)	(0.49)
Physical Activity (Adolescents): Y=1, N=0	0.62	0.54	0.71
	(0.49)	(0.50)	(0.46)
Self-control	0.00	0.02	-0.02
	(1.00)	(1.04)	(0.95)
Extraversion	0.00	0.00	0.00
	(1.00)	(1.00)	(1.00)
Openess	0.00	0.03	-0.03
	(1.00)	(1.00)	(1.00)
Conscientiousness	0.00	-0.03	0.03
	(1.00)	(1.00)	(1.00)
Agreeableness	0.00	-0.01	0.01
	(1.00)	(1.00)	(1.00)
Neuroticism	0.00	0.20	-0.21
	(1.00)	(0.99)	(0.96)
Teasing Between Classmates at School:Y=1, N=0	0.64	0.65	0.63
	(0.48)	(0.48)	(0.48)
Time studying	0.00	0.04	-0.04
	(1.00)	(1.00)	(1.00)
Time sleeping	0.00	-0.01	0.01
	(1.00)	(1.06)	(0.94)
Time with friends	0.00	-0.05	0.05
	(1.00)	(1.00)	(1.00)
Time watching TV	0.00	-0.03	0.03
	(1.00)	(0.98)	(1.02)
One Parent Smokes: Y=1, N=0	0.23	0.23	0.23
	(0.42)	(0.42)	(0.42)
Adult Overweight or Obese: Y=1, N=0	0.70	0.71	0.70
	(0.46)	(0.45)	(0.46)
Number of rooms	3.79	3.76	3.82
	(1.68)	(1.70)	(1.66)
Transfers from PROGRESA: Y=1, N=0	0.16	0.18	0.14
	(0.37)	(0.38)	(0.35)
Transfers for other social programs	0.10	0.10	0.10
	(0.30)	(0.30)	(0.30)
Remittances: Y=1, N=0	0.03	0.04	0.02
	(0.17)	(0.19)	(0.13)
Transfer for family inside country	0.03	0.03	0.02
	(0.16)	(0.16)	(0.15)
Rents	0.03	0.02	0.03
	(0.16)	(0.15)	(0.17)
Index durable goods (entertainment)	0.00	-0.01	0.01
	(1.00)	(0.99)	(1.01)

Source: Mexican Social Mobility Survey 2015 (SMS-2015).
Standard errors in parentheses

Table 2: **OLS Estimates: Effects of Parents Who Smoke on Adolescents Overweight**

	(1)	(2)	(3)	(4)
Dep Var: Overweight (Adolescent)				
One Parent Smokes: Y=1, N=0	0.085***	0.079***	0.076***	0.078***
	(0.021)	(0.021)	(0.021)	(0.021)
Sex: Boys=1, Girls=0	0.084***	0.085***	0.080***	0.079***
	(0.019)	(0.019)	(0.020)	(0.020)
Age	-0.037***	-0.037***	-0.038***	-0.038***
	(0.004)	(0.004)	(0.004)	(0.004)
Self-control (Adolescents)	-0.028***	-0.029***	-0.033***	-0.036***
	(0.010)	(0.010)	(0.011)	(0.011)
Teasing Between Classmates at School: Y=1, N=0	-0.030	-0.028	-0.022	-0.024
	(0.020)	(0.020)	(0.020)	(0.020)
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Other Controls:				
Time use[1]	No	Yes	Yes	Yes
Personality[2]	No	No	Yes	Yes
Income and assets[3]	No	No	No	Yes
R^2	0.10	0.10	0.11	0.11
Observations	2480	2467	2428	2390

Note: Cluster standard errors displayed in parenthesis at the municipality level. [1] Time use variables are: time studying, time sleeping, time with friends, and time watching tv. [2] Personality variables are: extraversion, agreeableness, conscientiousness, neuroticism, and openess. [3] Income and assets variables are: tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, and rents. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment. *** p<0.01, ** p<0.05, * p<0.1

Table 3: **Bounding Methodology: Effects of Parents Who Smoke on Adolescents Overweight**

	(1)	(2)	(3)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)
		Panel A : $0 \leq \delta \leq 1$	
One Parent Smokes: Y=1, N=0	[0.078, 0.079]	[0.078, 0.081]	[0.078, 0.101]
		Panel B : $-1 \leq \delta \leq 0$	
One Parent Smokes: Y=1, N=0	[0.077, 0.078]	[0.075, 0.078]	[0.055, 0.078]

Intervals in squares brackets are the bounds. The control variables are: sex, age, self-control, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, rents, and municipality fixed effects. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment.

Table 4: **OLS Estimates: Effects of Parents Who Smoke on Adolescents Overweight by Sex**

	Girls			Boys		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep Var: Overweight (Adolescent)						
(Adolescent)						
One Parent Smokes: Y=1, N=0	0.089***	0.088***	0.086***	0.067**	0.064**	0.075**
	(0.033)	(0.033)	(0.033)	(0.031)	(0.032)	(0.032)
Age	-0.023***	-0.026***	-0.026***	-0.051***	-0.050***	-0.050***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Self-control (Adolescents)	-0.035***	-0.038***	-0.040***	-0.017	-0.022	-0.027
	(0.013)	(0.014)	(0.014)	(0.016)	(0.018)	(0.018)
Teasing Between Classmates at School:	-0.091***	-0.085***	-0.084***	0.025	0.029	0.026
Y=1, N=0	(0.027)	(0.028)	(0.028)	(0.031)	(0.032)	(0.032)
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls:						
Time use[1]	Yes	Yes	Yes	Yes	Yes	Yes
Personality[2]	No	Yes	Yes	No	Yes	Yes
Income and assets[3]	No	No	Yes	No	No	Yes
R^2	0.13	0.14	0.16	0.14	0.14	0.15
Observations	1251	1235	1215	1216	1193	1175

Note: Cluster standard errors displayed in parenthesis at the municipality level. [1] Time use variables are: time studying, time sleeping, time with friends, and time watching tv. [2] Personality variables are: extraversion, agreeableness, conscientiousness, neuroticism, and openess. [3] Income and assets variables are: tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, and rents. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment. *** p<0.01, ** p<0.05, * p<0.1

Table 5: **Bounding Methodology: Effects of Parents Who Smoke on Adolescents Overweight (Girls)**

	(1)	(2)	(3)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)
		Panel A : $0 \leq \delta \leq 1$	
One Parent Smokes: Y=1, N=0	[0.084, 0.086]	[0.079, 0.086]	[0.044, 0.086]
		Panel B : $-1 \leq \delta \leq 0$	
One Parent Smokes: Y=1, N=0	[0.086, 0.089]	[0.086, 0.094]	[0.086, 0.128]

Intervals in squares brackets are the bounds. The control variables are: age, self-control, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, rents, and municipality fixed effects. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment.

Table 6: **Bounding Methodology: Effects of Parents Who Smoke on Adolescents Overweight (Boys)**

	(1)	(2)	(3)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)
		Panel A : $0 \leq \delta \leq 1$	
One Parent Smokes: Y=1, N=0	[0.075, 0.081]	[0.075, 0.095]	[0.075, 0.186]
		Panel B : $-1 \leq \delta \leq 0$	
One Parent Smokes: Y=1, N=0	[0.069, 0.075]	[0.055, 0.075]	[-0.036, 0,.075]

Intervals in squares brackets are the bounds. The control variables are: age, self-control, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, rents, and municipality fixed effects. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment.

Table 7: **OLS Estimates: Effects of Parents Who Smoke on Adolescents Overweight by Age**

	Age: 12-15			Age: 16-18		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep Var: Overweight (Adolescents)						
One Parent Smokes: Y=1, N=0	0.083***	0.085***	0.097***	0.079**	0.076**	0.069*
	(0.030)	(0.030)	(0.030)	(0.036)	(0.037)	(0.037)
Sex: Boys=1, Girls=0	0.115***	0.116***	0.119***	0.056*	0.046	0.045
	(0.026)	(0.027)	(0.027)	(0.030)	(0.030)	(0.031)
Self-control (Adolescents)	-0.024*	-0.026	-0.029*	-0.034**	-0.035**	-0.037**
	(0.014)	(0.016)	(0.016)	(0.014)	(0.016)	(0.016)
Teasing Between Classmates at School:Y=1, N=0	-0.039	-0.033	-0.036	-0.011	-0.009	-0.006
	(0.028)	(0.028)	(0.028)	(0.031)	(0.032)	(0.031)
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls:						
Time use[1]	Yes	Yes	Yes	Yes	Yes	Yes
Personality[2]	No	Yes	Yes	No	Yes	Yes
Income and assets[3]	No	No	Yes	No	No	Yes
R^2	0.11	0.11	0.13	0.12	0.12	0.13
Observations	1465	1437	1413	1002	991	977

Note: Cluster standard errors displayed in parenthesis at the municipality level. [1] Time use variables are: time studying, time sleeping, time with friends, and time watching tv. [2] Personality variables are: extraversion, agreeableness, conscientiousness, neuroticism, and openess. [3] Income and assets variables are: tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, and rents. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment. *** p<0.01, ** p<0.05, * p<0.1

Table 8: **Bounding Methodology: Effects of Parents Who Smoke on Adolescents Overweight (Age: 12-15)**

	(1)	(2)	(3)
	Oster (2016)	Gonzalez and Miguel (2015)	Conservative ($R_{max} = 1$)
		Panel A : $0 \leq \delta \leq 1$	
One Parent Smokes: Y=1, N=0	[0.097, 0.104]	[0.097, 0.118]	[0.097, 0.248]
		Panel B : $-1 \leq \delta \leq 0$	
One Parent Smokes: Y=1, N=0	[0.091, 0.097]	[0.076, 0.097]	[-0.054, 0.097]

Intervals in squares brackets are the bounds. The control variables are: age, self-control, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, rents, and municipality fixed effects. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment.

Table 9: **Mechanisms: Effects of Parents Who Smoke on Adolescents Overweight**

	(1)	(2)	(3)	(4)
Dep Var: Overweight (Adolescent)				
One Parent Smokes: Y=1, N=0	0.078***	0.080***	0.080***	0.081***
	(0.021)	(0.021)	(0.021)	(0.021)
Physical Activity (Adolescents):		0.042**		0.044**
Y=1, N=0		(0.021)		(0.021)
Adult Overweight or Obese:			0.106***	0.108***
Y=1, N=0			(0.020)	(0.021)
Sex: Boys=1, Girls=0	0.079***	0.074***	0.079***	0.074***
	(0.020)	(0.020)	(0.020)	(0.020)
Age	-0.038***	-0.036***	-0.039***	-0.037***
	(0.004)	(0.004)	(0.004)	(0.004)
Self-control (Adolescents)	-0.036***	-0.036***	-0.036***	-0.037***
	(0.011)	(0.011)	(0.012)	(0.011)
Teasing Between Classmates at School:	-0.024	-0.024	-0.026	-0.026
Y=1, N=0	(0.020)	(0.020)	(0.020)	(0.020)
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Other Controls:				
Time use[1]	No	Yes	Yes	Yes
Personality[2]	No	No	Yes	Yes
Income and assets[3]	No	No	No	Yes
R^2	0.11	0.12	0.12	0.13
Observations	2390	2378	2358	2346

Note: Cluster standard errors displayed in parenthesis at the municipality level. [1] Time use variables are: time studying, time sleeping, time with friends, and time watching tv. [2] Personality variables are: extraversion, agreeableness, conscientiousness, neuroticism, and openess. [3] Income and assets variables are: tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, and rents. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment. *** p<0.01, ** p<0.05, * p<0.1

9 Appendix

Table A1: **Krauth's Bounding Methodology: Effects of Parents Who Smoke on Adolescents Overweight (By Sex)**

	Total (1)	Girls (2)	Boys (3)
		$-1 \leq \delta \leq 1$	
One Parent Smokes	[0.049, 0.092]	[0.075, 0.111]	[0.038, 0.079]
(95% CI)	(-0.005, 0.144)	(-0.011, 0.191)	(-0.038, 0.155)
(90% CI)	(0.006, 0.133)	(0.005, 0.176)	(-0.022, 0.140)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: age, sex, self-control, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, rents, and municipality fixed effects. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment.

Table A2: **Krauth's Bounding Methodology: Effects of Parents Who Smoke on Adolescents Overweight (By Age)**

	Total (1)	Age: 12-15 (2)	Age: 16-18 (3)
		$-1 \leq \delta \leq 1$	
One Parent Smokes	[0.049, 0.092]	[0.069, 0.105]	[-0.026, 0.119]
(95% CI)	(-0.005, 0.144)	(-0.001, 0.190)	(-0.130, 0.204)
(90% CI)	(0.006, 0.133)	(0.011, 0.174)	(-0.107, 0.185)

Intervals in squares brackets are the bounds, while the intervals in the round brackets are confidence intervals. The control variables are: sex, self-control, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, rents, and municipality fixed effects. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment.

Table A3: **Intrumental Variables: Effects of Parents Who Smoke on Adolescents Overweight**

	All (1)	Girls (2)	Boys (3)	Age 12-15 (4)	Age 16-18 (5)
Dep Var: Overweight (Adolescents)					
One Parent Smokes: Y=1, N=0	0.083***	0.077**	0.050	0.083**	0.038
	(0.022)	(0.032)	(0.034)	(0.035)	(0.028)
Observations	2390	1215	1175	1413	977

Note: Cluster standard errors displayed in parenthesis at the municipality level. Controls are: sex, age, self-control, scam among classmates at school, municipality fixed effects, time studying, time sleeping, time with friends, time watching tv, extraversion, agreeableness, conscientiousness, neuroticism, and openess, tranfers from PROGRESA, transfers for other social programs, remittances, transfer for family, and rents. It also incudes: Number of rooms, and an index for durable goods regaridng entertainment. All the regressions use the instrument proposed by Lewbel (2012): $(Z - \bar{Z})\hat{\epsilon_2}$, where Z is all the regressors in X except the constant. *** p<0.01, ** p<0.05, * p<0.1