Conditional Cash & Adolescent Risk Behaviors: Evidence from Urban Mexico

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ABSTRACT

This paper analyzes the impact of conditional cash transfers (CCT) on adolescent risk behaviors. It postulates distinct potential effects through short-term income gains as well as changes in human capital and expectations. The paper tests a model with data from the OPORTUNIDADES program in Mexico. Risk behaviors data from 3743 young people (1964 females and 1779 males; aged 12 to 24) in urban areas were collected via audio computer-assisted self-interviews (A-CASI) to minimize biases. The main outcomes analyzed were: current smoking, alcohol consumption, sexual initiation, condom use at the first as well as at the last sexual intercourse; and future expectations (graduation from high school). The main explanatory variables were: household enrollment into the program and the level of cumulative cash transfers received. To address endogeneity of enrollment choice and program compliance, we used a set of instrumental variables. The results show a protective effect of the program on smoking and drinking, which is consistent with a higher expectation of high school graduation. The program does not seem to have an effect, either positive or negative, on sexual behaviors.

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Keywords: conditional cash transfers; adolescent risk behaviors; OPORTUNIDADES; instrumental variables; Mexico

1. INTRODUCTION

Adolescence is a crucial time for decision making and experimentation. Before finishing high school, many adolescents will have tried smoking and drinking, as well as unprotected sexual intercourse (Arnett 2007). These risk behaviors can have detrimental consequences for individual health as well as overall human and economic development (WHO 2001; Aral *et al.* 2006; Dick *et al.* 2006; Jha *et al.* 2006; Lule *et al.* 2006). Patterns of healthy and harmful behaviors are set early in life; thus, the impact of interventions on adolescents is of importance not only for the immediate effects on individuals, but also for public health and public policy (Jamison *et al.* 2006).

Adolescents tend to have shorter-term horizons that are biased towards present consumption rather than long-term saving and investment (Gruber 2001). In addition, poverty has a perverse effect on adolescents and young adults as it further reduces their incentives for longer-term investments in education and health (Sen 1999).

Can public policies affect adolescent choices? This paper tests whether a program that uses conditional cash transfers (CCT) can affect adolescent risk behaviors. We test whether CCT can alter life course decisions of some adolescents who could otherwise suffer from excess morbidity and mortality due to consumption of tobacco and alcohol products, as well as engaging in unsafe sex. We posit that CCT can change the incentives structure in which adolescent risk behaviors take place so that some of the costs are no longer so far in the distant future, and some of the rewards are also received much earlier.

We present a simple model to analyze the opposing effects of income, human capital and expectations on risk behaviors; and then we analyze empirical data from the OPORTUNIDADES program in Mexico to test the theory. Using a rich dataset, we use instrumental variables (IV) to control for selection biases inherent in observational

datasets. We first present OLS estimates with an ample set of covariates modeling risk behaviors and expectations as a function of individual, household, and head of household characteristics. Results from the naïve estimates can mask the true impact of the program due to potential endogeneity: as the households more likely to choose to participate can also be the households with adolescents less involved in risk behaviors. The use of instrumental variables can help to reduce the likelihood of spurious correlations between treatments and outcomes.

The paper is organized as follows. In the next section, we present a brief background to CCT programs and the Mexican anti-poverty program, OPORTUNIDADES. Then, we present a simple theoretical model, followed by the empirical estimation strategy, including a description of the dataset and sources. The presentation of the empirical results is followed by a discussion section and conclusions.

2. BACKGROUND

In the last decade, Latin America has had several conditional cash transfer programs in operation, including OPORTUNIDADES (formerly PROGRESA) in Mexico, *Bolsa Alimentação* in Brazil, Red de Protección Social in Nicaragua, *Programa de Asignación Familiar* in Honduras, *Familias en Acción* in Colombia, *Subsidio Único Familiar* in Chile, and the *Program of Advancement through Health and Education* in Jamaica. In addition, a CCT program has been implemented in New York City: *Opportunity NYC* (Lagarde *et al.* 2007).

Mexico was the first country to implement a rigorously-evaluated CCT program. In 1997, the PROGRESA program (Spanish acronym for "Program for Education, Health and Nutrition") was the first in the world to set up a randomized controlled trial at the community level to test the concept of CCT in the rural areas. Renamed as

OPORTUNIDADES (or "Opportunities Program for Human Development") in 2000, the main objective remained the same: to interrupt the intergenerational transfer of poverty by means of conditional cash transfers.

The economic incentives are received only when the beneficiary family fulfills specific responsibilities including attending health promotion workshops, keeping school-age children and adolescents in school, and attending periodic preventive medical check-ups (SEDESOL 2004; Rawlings & Rubio 2005; Levy 2006). The health talks include various themes including: adolescence and sexuality; family planning; prevention against addictions (smoking, drinking, and other substances); sexually transmitted infections, HIV/AIDS; gender and health; intra-family violence. In addition, in the regular health check ups for adolescents, medical personnel may provide individualized guidance and information regarding sexuality, contraception (including condom use), and testing for sexually transmitted infections (including HIV/AIDS); as well as assessment of possible problems related to addictions. An additional component that is relevant for adolescents is the "*beca*" or scholarship that provides additional economic incentives if the OPORTUNIDADES participants finish high school before they turn 22 (SEDESOL 2004).

The experimental evaluation of the OPORTUNIDADES program has shown that it has had an effect on preventive health care utilization and child health outcomes, including early childhood development and cognition; as well as lower prevalence of obesity and hypertension and better self-reported health in adults in rural Mexico (Gertler 2004; Fernald *et al.* 2008b; Fernald *et al.* 2008c). However, a positive correlation between the level of cash transfers and the body mass index has also been documented (Fernald *et al.* 2008a).

The OPORTUNIDADES program in the urban areas was evaluated with quasi-experimental and non-experimental methods. There is evidence that risk behaviors are highly prevalent among adolescents and young adults in Mexico (Sanchez-Aleman *et al.* 2005; Gutierrez *et al.* 2006). A propensity score matching study found that the program may have some modest protective effects on smoking and drinking, but it did not find any effects on sexual practices (Gutierrez *et al.* 2005).

Whether additional information and resources at the individual and family level affect sexual risk and other behaviors continues to be a policy concern in Mexico and beyond (Reddy-Jacobs *et al.* 2006; Walker *et al.* 2006).

3. MODEL

In this section we present a simple theoretical model to analyze the effect of the conditional cash transfers on adolescent risk behaviors. Consider two periods: the first when decisions about risk behaviors are made during adolescence, and the second when adult consumption is realized. The model focuses on three distinct pathways to account for the ultimate effects. First, additional cash in the first period (through the conditional transfers) implies that there could be a short-run income effect whereby risk behaviors can increase. The household budget is relaxed, and thus adolescents can have additional cash to engage in smoking, drinking and unprotected sex. However, more risk behaviors in adolescence, in turn, can imply less overall consumption in adulthood because of disutility linked to the risky behaviors (e.g., unwanted teenage pregnancy), and overall lesser productivity (due to overall worse levels of health).

Second, the conditional cash transfers can have a positive effect on human capital investments through increased years of formal education which can lead to higher income and consumption during adulthood. The program conditionality for

school-age children to remain in school implies that the adolescents will have more years of formal education, and thus higher incomes in the second period (during adulthood). The human capital effect could reduce risk behaviors, as they make additional efforts to attend school regularly, improve test scores and avoid repeating grades. However, higher expected income can also imply more risky behaviors in adolescence (as long as risk behaviors are normal goods).

Third, there can be an effect through expectations about a brighter future. The conditionality to remain in school and attend preventive health and life skills workshops can increase not only future income but also alter the preferences for future versus present consumption. This effect can reduce adolescent risk behaviors.

The total net effect will depend on the relative sizes of the different income and human capital effects. Following a general framework (O'Donoghue & Rabin 1999), and a model to analyze adolescent's risk behaviors (O'Donoghue & Rabin 2000), consider a two-period model where lifetime utility function (U) is based on the consumption of risk behaviors during adolescence (time $t=1$), and the consumption of all other goods during adulthood (time $t=2$), such that:

$$U = u(R_1, C_1) + \delta u(C_2), \quad 0 < \delta \leq 1 \qquad (1)$$

where:

R_1 = risk behaviors during adolescence (time $t=1$),

C_1 = all other goods consumed during adolescence (time $t=1$)

C_2 = all other goods consumed during adulthood (time $t=2$)

δ = discount rate or time preference factor.

The subjective discount rate δ measures the individual's preference for immediate gratification now versus consumption in the future.

Assuming rational utility-maximizing behavior on the part of the adolescents, comparative statics exercises with this theoretical model (see Appendix A for details) reveal that:

a) A short-run income effect, through the conditional cash transfers, has an ambiguous effect on adolescent risk behaviors;

b) As years of education increase, and as income and consumption in adulthood increase, then adolescents engage in more risky behaviors, not less.

c) However, as adolescents change their (subjective) discount factor (as a result of an orientation towards the future, rather than an orientation towards immediate gratification), they can reduce their risk behaviors.

Thus, the overall effect of a CCT program is not readily obvious from the theoretical exercise. An empirical estimation is required to gauge the final impact.

4. EMPIRICAL ESTIMATION

The theory presented above can be tested with a reduced system of equations from the utility maximizing model, and estimated using cross-sectional data where adolescents' risk behaviors at time $t=1$ are a function of household income, cumulative conditional cash transfers, and other relevant covariates; and where the decision to engage in risk behaviors is influenced by both current disposable income, and the expectations about future consumption and human capital investment opportunities.

4.1 Data Sources and Study Population

We used data from two main sources: the OPORTUNIDADES urban evaluation questionnaires: *Encuesta de Evaluación de los Hogares Urbanos*, ENCELURB 2004 (SEDESOL 2007); and the expanded adolescent risk behaviors module implemented in

2004 (INSP 2004). The surveys defined "urban" as localities with 2,500 people or more.

Data for beneficiaries and non-beneficiaries of the program were collected as part of a national evaluation of the anti-poverty campaign. The expanded risk behaviors module was implemented using audio computer-assisted self-interviews (A-CASI) to reduce response and social desirability biases; A-CASI also ensured confidentiality, improved response rates and the veracity of the information (Gutierrez & Torres-Pereda 2009).

We utilized data from all the households in the sample regardless of whether they had participated or not in the OPORTUNIDADES program: it included 3743 urban adolescents and young adults (1964 females and 1779 males; aged 12 to 24) who responded the expanded risk behavior module. Respondents who lived in participating households received CCT (as reported in administrative data sources).

To ensure comparability in terms of socio-economic status between treated and control individuals and households, we restricted the analytical sample to households in the lowest wealth deciles. We checked the robustness of this approach by utilizing alternative ways to discriminate between the poor, the near-poor and the non-poor (see Section 7).

4.2 Dependent variables

The dependent variables analyzed were adolescent risk behaviors (smoking, alcohol, sexual initiation, and condom use at first as well as last sexual intercourse); and future expectations (specifically about graduation from high school).

4.3 Treatment (main explanatory) variables

The main explanatory variables where a dummy variable to indicate household affiliation into the program (T), and the (log of) actual cumulative conditional cash transfers (T_1), as given by the administrative records (SEDESOL 2007). The actual transfers for 2002-2004 were deflated with the consumer price index from the Mexican Central Bank, using June 2002 as a base (Banco de Mexico 2007).

4.4 Identification Strategy

Our strategy to control for the potentially spurious correlation between treatments and outcomes was twofold. First, we included a large number of covariates which can reduce considerably the potential confounding and the possibility of biases in the OLS estimates. These covariates included:

- variables at the level of the individual: age, a dummy if the person was married or in civil union, a dummy if the person did not complete primary education, the number of friends to discuss personal problems with, a dummy if the person thinks at least one parent has problem with alcohol;
- variables at the level of the household: number of siblings, whether the adolescent has an older brother or an older sister; whether father is present; whether spouse is present, the mother's education, and family wealth.
- variables for the head of household: dummy for whether the head of household is female; head of household's age, years of education, and whether he or she speaks an indigenous language.

Second, even with a large number of covariates, we can still have potential confounding that could lead to biased OLS estimates, particularly because the

characteristics that make a household more or less likely to enroll in the program may also make a difference in the risk behaviors and expectations of the adolescents and young adults in the household. Parental education, household permanent income and wealth may influence both the likelihood of treatment (household participation in OPORTUNIDADES and the level of transfers) as well as outcomes (risk behaviors and expectations). The urban households that incorporated into the program were self-selected, thus the outcomes could potentially be correlated with individual and household-level characteristics, and be subject to biases. To reduce such biases, we estimated the impact of program participation and the level of actual transfers using instrumental variables (IVs). We used two main IVs: the level of potential cumulative transfers at the household level (*z1a*); and the proportion of households where someone knew about the OPORTUNIDADES program at the Census block level (*z2*).

OPORTUNIDADES cash transfers are given to the female head of household, and are conditional on children attending school, family members obtaining preventive medical care and attending "*pláticas*" or education talks on health related topics. Compliance is verified through the clinics and schools that certify whether households actually completed the required health care visits and whether children and adolescents actually attended schools. The cash transfers are given bimonthly in two forms. First, all households receive a fixed food stipend conditional on family members obtaining preventive medical care, and it is intended to improve nutrition. Second, households receive a transfer in the form of educational scholarships, and it is given conditional on children and adolescents attending school a minimum of 85 percent of the time and on not repeating a grade more than twice. The educational stipend is provided bimonthly for each child less than 18 years old enrolled in school between the third grade of primary school and the third grade (last) of junior high and varies by grade and gender. It rises

substantially after graduation from primary school and is higher for girls than boys during junior high school. An additional scholarship is granted also to all beneficiaries who finish high school before they turn 22 years old. Beneficiary children and adolescents also receive money for school supplies. Hence, according to the program rules, differently composed households are eligible to receive different transfer amounts, up to a stated maximum level. For example, households with more female children enrolled in higher grades are eligible for larger transfers than similar households with children enrolled in lower levels, or with more male children.

The maximum potential bimonthly transfer for a given household can be computed applying the program rules as follows:

$$PT_{jt} = \min\left(T_{\max}, BT_t + \sum_s ST_{st} NK_{sjt}\right) \tag{2}$$

where PT_{jt} is maximum potential bimonthly transfer that could be received by household j in period t, T_{max} is the program cap on benefits, BT_t is the basic transfer amount that all households receive (the nutritional stipend), ST_{st} is the transfer conditional on a child or adolescent of type s (i.e. based on grade and sex) attending school, and NK_{sjt} is the number of children and adolescents of type s in household j at baseline, aged forward to period t. Because of the cap on total benefits, potential transfers are a nonlinear function of the number of baseline children and adolescents who can attend grades three through nine in period t.

The actual amount of transfers received by a household can be less than the potential amount if some children do not attend school. Thus, the actual bimonthly transfer amount received by household j at each time t, AT_{jt}, is computed by applying the program rules to the following formula:

$$AT_{jt} = \min\left(T_{\max}, BT_t + \sum_s ST_{st} K_{sjt}\right) \tag{3}$$

where K_{sjt} is the number of children and adolescents of type s in household j that are actually attending school in period t.

An instrumental variables approach (Heckman & MaCurdy 1985; Angrist 2001) helped us to identify how program participation and the level of actual conditional cash transfers affected adolescent risk behaviors (smoking, alcohol, sexual initiation, and condom use), as well as future expectations (graduation from high school). The standard IV approach involves two stages. In the first stage, we modeled the household decision to participate in the program and the actual cash transfers "treatment" as a function of the instruments and the covariates. In the second stage, we modeled the outcomes (risk behaviors and expectations) as a function of the predicted participation rates and the predicted levels of transfers (from the first stage) and the covariates. Similar approaches have been used in the Mexican OPORTUNIDADES program to evaluate the impact of program participation and transfers on productive activity and also on child nutritional, growth and development outcomes (Gertler *et al.* 2006; Fernald *et al.* 2008b).

4.5 Econometric specification

In the first set of empirical models, individual risk behaviors were a function of program participation or treatment (T), as well as controls for characteristics of the individual, the head of household, and of the household, as follows:.

$$Y_{i,j,2004} = \alpha(T_{j,2002}) + \sum_k \beta_k X_{i,k,2002} + \sum_l \beta_l X_{j,l,2002} + \varepsilon_{i,j} \qquad (4)$$

where:

$Y_{i,j,2004}$ = outcomes (risk behaviors) for adolescent i in household j for 2004;

$T_{j,2002}$ = a dummy variable=1 if the household j enrolled into the urban OPORTUNIDADES program in 2002

X_i = baseline (2002) characteristics of individual (i)

X_j = baseline (2002) characteristics of household j , for $i \in j$

$\varepsilon_{1,i,j}$ = idiosyncratic error term at the individual and household levels.

Second, we used an empirical specification model where the basic structure in (4) was kept the same, but we added the effect of cumulative cash transfers received by the households as follows:

$$Y_{i,j,2004} = \alpha(T_{j,2002}) + \gamma Ln(T_{1,j,2002-2004}) + \sum_k \beta_k X_{i,k,2002} + \sum_l \beta_l X_{j,l,2002} + \varepsilon_{i,j} \quad (5)$$

where

$T_{1,j,2002\text{-}2004}$ = amount of cumulative cash transfers received by household j up until time of interview (2004).

Under the OLS or naïve estimate, the treatment (T) in eq. (4) was assumed to be exogenous or independent of outcomes. Under the IV estimation, the treatments (T and T_1) were instrumented using the full covariate vectors and the IVs.

5. RESULTS

Table 1a shows the descriptive characteristics of the 1964 females in the sample (745 in OPORTUNIDADES and 1219 in non-beneficiary households). In terms of the response variables, about six percent of the females currently smoked. The female adolescents living in OPORTUNIDADES beneficiary households were less likely to drink (17.7 percent) than the non-beneficiary counterparts (22 percent). Over 50 percent of respondents initiated sex after the program started. Only one in four female respondents used a condom during the first sexual intercourse; and less than one in six did so during

the last sexual intercourse. In a scale from 1 to 4 (1=not at all and 4=for sure) for the expectation to graduate from high school, the mean response was 2.5.

With respect to the covariates, the mean age was 17 years; regarding marital status, beneficiaries (14.6 percent) were less likely to be married than non-beneficiaries (18.6 percent); and more likely (13.6 percent) than counterparts (9.3 percent) not to have completed primary school. Also, beneficiary households were more likely to be female headed; the household head had less years of formal education, and was more likely to speak an indigenous language. The mothers in OPORTUNIDADES had less years of formal education; and lived in poorer households. These results support the general design of the CCT program which emphasizes enrolling families of lower socio-economic status.

Finally, as hypothesized, in terms of the instrumental variables, beneficiaries had higher levels of potential cumulative transfers, and they were more likely to be in an area with more intense advertisement where more people knew about the program.

Table 1a. Descriptive statistics for females, by program status

	Non-beneficiaries			OPORTUNIDADES beneficiaries			t-test
	N	Mean	*Std. Dev.*	N	Mean	*Std. Dev.*	*(p-value)*
Dependent Variables							
Smokes	1210	0.069	*0.253*	743	0.059	*0.236*	*0.415*
Drinks alcohol	1216	0.220	*0.415*	744	0.177	*0.382*	*0.022*
Sexually active (if so, after program started)	152	0.578	*0.495*	83	0.542	*0.456*	*0.589*
Used condom during first sexual intercourse	153	0.255	*0.437*	83	0.289	*0.456*	*0.572*
Used condom during last sexual intercourse	288	0.163	*0.370*	140	0.150	*0.358*	*0.727*
Expects to graduate from high school (1=not at all; to 4=for sure)	959	2.465	*1.158*	630	2.471	*1.113*	*0.913*
Covariates							
Age	1219	17.2	*2.2*	745	17.0	*2.1*	*0.231*
Married or in civil union	1219	0.186	*0.389*	745	0.146	*0.354*	*0.023*
Not completed primary	1219	0.093	*0.290*	745	0.136	*0.343*	*0.003*
Number of friends to discuss personal problems with	1184	2.1	*2.4*	723	2.1	*2.3*	*0.567*
Thinks at least one parent has problem with alcohol	1169	0.159	*0.366*	707	0.185	*0.389*	*0.143*
Number of siblings	1219	1.8	*0.9*	745	1.9	*0.9*	*0.562*
Has an older sister	1219	0.196	*0.397*	745	0.196	*0.397*	*0.996*
Has an older brother	1219	0.169	*0.375*	745	0.174	*0.380*	*0.753*
Head of household (HH) is female	1219	0.221	*0.415*	745	0.311	*0.463*	*0.000*
Head of HH's age	1219	44.3	*11.6*	745	44.1	*11.7*	*0.754*
Head of HH's education (in years)	1219	5.1	*3.6*	745	4.2	*3.4*	*0.000*
Head of HH speaks an indigenous language	1171	0.097	*0.297*	730	0.152	*0.359*	*0.000*
Mother present	1219	0.820	*0.384*	745	0.824	*0.381*	*0.830*
Father present	1219	0.630	*0.483*	745	0.596	*0.491*	*0.132*
Spouse present	1219	0.992	*0.090*	745	0.993	*0.082*	*0.713*
Mother's education	1219	4.2	*3.0*	745	3.6	*3.0*	*0.000*
Log of family wealth ('000s pesos Nov 2002)	1219	7.17	*0.82*	745	7.09	*0.89*	*0.036*
Instrumental Variables							
Log of potential cumulative transfers (z1a)	1175	1.52	*3.16*	736	9.59	*1.11*	*0.000*
Proportion of households who know about the OPORTUNIDADES program (block level) (z2)	1196	0.31	*0.32*	718	0.72	*0.19*	*0.000*

Source: Authors' calculations based on *Encuesta de Evaluación de los Hogares Urbanos*, ENCELURB 2004 (SEDESOL 2007); and the 2004 Expanded Adolescent Risk Behaviors module (INSP 2004). Note: Unless otherwise noted, the values are for the second wave of data collection (2004). Although the adolescent risk module sample was smaller in 2002, note that the differences in the dependent variables were not statistically significant in the first wave (2002).

Table 1b summarizes the characteristics of the 1779 adolescent males in the sample (714 in OPORTUNIDADES and 1065 in non-beneficiary households). In terms of risk behaviors and expectations, adolescents in participating households were less likely to smoke (30% vs. 25%), less likely to drink (43% vs. 35%), and more likely to use a condom during their last sexual intercourse (74% vs. 65%). They were also more likely to expect graduating from high school. With respect to the covariates, OPORTUNIDADES adolescents were slightly younger, less likely to be married, and more likely to have an older brother than non-beneficiary counterparts. Beneficiary

households were more likely to be female-headed households, with younger heads of household who had less years of formal education, and were also more likely to speak an indigenous language; and more likely to be financially poorer.

Table 1b. Descriptive statistics for males, by program status

	Non-beneficiaries			OPORTUNIDADES beneficiaries			t-test
	N	Mean	*Std. Dev.*	N	Mean	*Std. Dev.*	*(p-value)*
Dependent Variables							
Smokes	1062	0.298	*0.458*	708	0.251	*0.434*	*0.031*
Drinks alcohol	1059	0.431	*0.496*	711	0.353	*0.478*	*0.001*
Sexually active (if so, after program started)	162	0.432	*0.497*	100	0.410	*0.494*	*0.726*
Used condom during first sexual intercourse	164	0.524	*0.501*	105	0.514	*0.502*	*0.872*
Used condom during last sexual intercourse	256	0.648	*0.478*	133	0.744	*0.438*	*0.054*
Expects to graduate from high school (1=not at all; to 4=for sure)	876	2.387	*1.118*	636	2.513	*1.100*	*0.030*
Covariates							
Age	1065	17.1	*2.1*	714	16.7	*1.9*	*0.001*
Married or in civil union	1065	0.089	*0.285*	714	0.049	*0.216*	*0.001*
Not completed primary	1065	0.093	*0.291*	714	0.116	*0.321*	*0.112*
Number of friends to discuss personal problems with	1025	2.1	*2.7*	692	2.2	*2.4*	*0.405*
Thinks at least one parent has problem with alcohol	1017	0.160	*0.367*	674	0.188	*0.391*	*0.133*
Number of siblings	1065	1.8	*0.9*	714	1.9	*0.8*	*0.154*
Has an older sister	1065	0.195	*0.397*	714	0.206	*0.405*	*0.585*
Has an older brother	1065	0.179	*0.384*	714	0.211	*0.409*	*0.092*
Head of HH is female	1065	0.233	*0.423*	714	0.304	*0.460*	*0.001*
Head of HH's age	1065	45.4	*10.6*	714	44.6	*9.6*	*0.069*
Head of HH's education (in years)	1065	4.7	*3.5*	714	4.5	*3.3*	*0.083*
Head of HH speaks an indigenous language	1017	0.112	*0.316*	704	0.141	*0.348*	*0.077*
Mother present	1065	0.918	*0.274*	714	0.934	*0.248*	*0.214*
Father present	1065	0.698	*0.459*	714	0.658	*0.475*	*0.081*
Spouse present	1065	0.998	*0.043*	714	1.000	*0.000*	*0.247*
Mother's education	1065	3.9	*3.0*	714	3.8	*3.0*	*0.465*
Log of family wealth ('000s pesos Nov 2002)	1065	7.14	*0.86*	714	7.06	*0.92*	*0.064*
Instrumental Variables							
Log of potential cumulative transfers (z1a)	1016	1.90	*3.52*	710	9.69	*0.94*	*0.000*
Proportion of households who know about the OPORTUNIDADES program (block level) (z2)	1044	0.34	*0.33*	679	0.72	*0.20*	*0.000*

Source: Authors' calculations based on *Encuesta de Evaluación de los Hogares Urbanos*, ENCELURB 2004 (SEDESOL 2007); and the 2004 Expanded Adolescent Risk Behaviors module (INSP 2004).
Note: Unless otherwise noted, the values are for the second wave of data collection (2004). Although the adolescent risk module sample was smaller in 2002, note that the differences in the dependent variables were not statistically significant in the first wave (2002).

Table 2 reports the first-stage regressions for the models of program participation (T) and for the log of actual OPORTUNIDADES transfers (T_1), for all and by gender, and as a function of the instrumental variables (i.e., potential transfers at the household level and proportion of households that knew about OPORTUNIDADES at

the block level), and all other covariates (not shown)[1]. The R^2 statistics were high for the program participation models: 71, 74, and 67 percent of the variability was explained, respectively, for all, females and males. In the actual cash transfers (T_1) model specification, the variables in the model explained most of the variation in actual transfers at the household level. In addition, the joint tests of IV significance demonstrated that the instruments were strong predictors of the "treatments" or "exposures". For example, for females, the *F* statistic in the program participation model was 2216 thus highly significant ($p = 0.000$); and for males, the *F* statistic for joint instrument significance 1475 hence, also highly significant ($p = 0.000$). These results showed that the IVs are highly relevant, strong predictors of program participation. Since the *F* statistics were by far above the customary threshold, the possibility of weak instruments did not seem to be a concern (Bound *et al.* 1995).

Table 2. First stage regressions: Models of OPORTUNIDADES program participation (T) and actual transfers (T1)

	All		**Females**		**Males**	
Instrumental Variables	T	T1	T	T1	T	T1
Log of potential cumulative transfers (z1a)	0.074**	0.955**	0.074**	0.954**	0.074**	0.956**
	[0.001]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
Proportion of households who know about OPORTUNIDADES (Census block level) (z2)	0.277**	0.262**	0.320**	0.253**	0.232**	0.279**
	[0.016]	[0.024]	[0.021]	[0.035]	[0.025]	[0.033]
F-statistic of excluded instruments	3637	210000	2216	97495	1475	120000
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Observations	3217	3217	1699	1699	1518	1518
R-squared	0.705	0.993	0.737	0.992	0.674	0.994

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Note: All models control for the covariates presented in Tables 1a and 1b.

Table 3 summarizes the effect of OPORTUNIDADES on adolescent risk behaviors, assuming that program participation was exogenous (in "naïve" models). Adolescent women in participating households were less likely to drink alcohol. Similarly, using OLS, adolescent males living in OPORTUNIDADES households were

[1] Regression result tables with all the covariates are presented in this working paper as Appendix B.

less likely to smoke and drink, and they were more likely to expect graduating from high school.

Table 3. Naive effect of OPORTUNIDADES participation on risk behaviors & expectations

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Females						
Household took up OPORTUNIDADES program	-0.008	**-0.047***	-0.012	0.084	-0.025	-0.008
	[0.013]	[0.020]	[0.067]	[0.066]	[0.044]	[0.058]
Observations	1749	1755	212	215	355	1430
R-squared	0.019	0.039	0.325	0.142	0.054	0.146
Males						
Household took up OPORTUNIDADES program	**-0.040+**	**-0.063****	0.012	-0.021	0.054	**0.125***
	[0.023]	[0.024]	[0.063]	[0.070]	[0.052]	[0.060]
Observations	1575	1577	227	233	339	1361
R-squared	0.075	0.102	0.265	0.074	0.178	0.086

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Note: All models control for the covariates presented in Tables 1a and 1b.

Table 4 shows the naïve models of risk behaviors and expectations using both program participation and the log of cumulative actual transfers as treatment variables. For females, program participation was protective for alcohol use, and it increased condom use during the first sexual intercourse. The total transfers were also slightly protective for smoking. Nevertheless, for males, the naïve effect of program participation was erased by controlling for actual transfers. The latter, however, increased slightly the expectation of finishing high school.

Table 4. Naive effect of OPORTUNIDADES participation and transfers on risk behaviors & expectations

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Females						
Household took up OPORTUNIDADES program	0.026	**-0.068**	-0.068	**0.215**	0.059	0.041
	[0.023]	[0.037]+	[0.126]	[0.119]+	[0.076]	[0.107]
Log of cumulative actual transfers	**-0.004**	0.003	0.007	-0.016	-0.012	-0.006
	[0.002]+	[0.004]	[0.013]	[0.012]	[0.009]	[0.011]
Observations	1749	1755	212	215	355	1430
R-squared	0.02	0.04	0.33	0.15	0.06	0.15
Males						
Household took up OPORTUNIDADES program	-0.023	-0.033	-0.099	-0.068	0.033	-0.038
	[0.038]	[0.042]	[0.101]	[0.109]	[0.087]	[0.102]
Log of cumulative actual transfers	-0.002	-0.004	0.015	0.006	0.003	**0.022***
	[0.004]	[0.004]	[0.011]	[0.012]	[0.009]	[0.011]
Observations	1575	1577	227	233	339	1361
R-squared	0.075	0.102	0.272	0.075	0.178	0.088

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Note: All models control for the covariates presented in Tables 1a and 1b.

Now addressing the endogeneity issues, Table 5 shows that the IV estimate for program participation for female adolescents reduced the likelihood of smoking (by 3.0 percentage points (pp)), and in drinking (by 5.0 pp). On the other hand, program participation for male adolescents reduced the probability of smoking by 5.2 pp, smoking by 7.2 pp, and increased the expectation of finishing high school by 0.212 points (in the 1 to 4 scale). Comparing with the naïve results (in Table 3), the IV correction increased the size of the protective OPORTUNIDADES effect for all the significant variables in the naïve models.

Table 5. Instrumental variables effect of OPORTUNIDADES participation on risk behaviors & expectations

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Females						
IV for HH enrollment into OPORTUNIDADES program	**-0.030***	**-0.050***	0.022	0.045	-0.038	0.008
	[0.015]	[0.024]	[0.075]	[0.076]	[0.050]	[0.069]
Observations	1691	1696	207	210	344	1384
R-squared	0.018	0.04	0.325	0.134	0.057	0.144
Males						
IV for HH enrollment into OPORTUNIDADES program	**-0.052+**	**-0.072***	0.066	0.017	0.068	**0.212****
	[0.028]	[0.030]	[0.076]	[0.085]	[0.064]	[0.074]
Observations	1511	1512	219	224	323	1300
R-squared	0.071	0.105	0.266	0.092	0.166	0.085

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Note: All models control for the covariates presented in Tables 1a and 1b.

5.1 The preferred model of the effect of conditional cash on risk behaviors

Table 6 presents the instrumental variables models for OPORTUNIDADES program participation and the log of cumulative transfers. For females, program participation reduced smoking (by 19.5 pp) while cumulative transfers increased the probability of smoking (by 1.5 pp). Similarly, while program enrollment decreased the likelihood of alcohol use (by 30.8 pp) for participants, cumulative transfers increased that likelihood by 2.4 pp with respect to non-participants. For the expectation variable, the results also showed the offsetting effects of program participation and income. These results were

similar for males, in terms of smoking prevalence and expectation to graduate from high school.

Table 6. Instrumental variables effect of OPORTUNIDADES participation & transfers on risk behaviors & expectations

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Females						
IV for HH enrollment into OPORTUNIDADES program	**-0.195****	**-0.308****	0.061	0.274	0.173	**0.683***
	[0.071]	[0.112]	[0.388]	[0.389]	[0.172]	[0.300]
IV for the log of cumulative actual transfers	**0.015***	**0.024***	-0.004	-0.020	-0.021	**-0.064***
	[0.006]	[0.010]	[0.035]	[0.034]	[0.017]	[0.028]
Observations	1691	1696	207	210	344	1384
R-squared	0.03	0.02	0.32	0.14	0.06	0.12
Males						
IV for HH enrollment into OPORTUNIDADES program	**-0.497***	-0.209	-0.326	0.818	0.648	**1.308***
	[0.194]	[0.204]	[0.558]	[0.508]	[0.505]	[0.514]
IV for the log of cumulative actual transfers	**0.039***	0.012	0.034	-0.069	-0.051	**-0.098***
	[0.017]	[0.018]	[0.047]	[0.043]	[0.044]	[0.045]
Observations	1511	1512	219	224	323	1300
R-squared	-0.02	0.095	0.257	-0.196	0.024	-0.029

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Note: All models control for the covariates presented in Tables 1a and 1b.

5.2 Effect Pathways

In thinking about the pathways for the effect of CCT programs on adolescent risk behaviors, there is a demonstrated human capital effect through which OPORTUNIDADES exerts an important change in preventive health care visits and on enrollment and educational achievement (Gertler 2004; Hoddinott & Skoufias 2004; Schultz 2004; Behrman & Hoddinott 2005; Behrman *et al.* 2005). In addition to the human capital effect, we posit that expectations would play an important role in reducing risk behaviors. Hence, we added the expectation of graduating high school as a response variable to show an illustrative example of the changes in adolescent expectations. Table 5 shows that IV-corrected program participation increased the expectation of high school graduation for males; and the preferred model, in Table 6, shows that program participation increased that expectation for both males and females.

6. ROBUSTNESS CHECKS

In this section we summarize the results from sensitivity analysis exercises to check the robustness of the results.

6.1 Alternative comparison sample

First, we checked the robustness of the comparison between socio-economic categories. Instead of using the lowest income deciles, we constructed an alternative analytical sample as follows. We used only the poor population as discriminated by the program scoring for poor, near-poor and non-poor (SEDESOL 2004; CONAPO 2005). The results for the alternative sample were qualitatively similar to the main results presented in this paper.

6.2 Alternative exclusion restrictions for model identification

Second, we also tested the models with alternative instrumental variables that were relevant and valid, but not as strong as those presented already. The alternative IVs included: potential current year transfers; potential current month transfers; one-month lagged potential transfers; and six-month lagged potential transfers. We also used an additional aggregated instrument, the proportion of poor at the Census block level, as well as interactions with education. The additional instrumental variables worked well, and passed all the IV tests. The results with alternative IV specifications did not change the overall protective effect of the OPORTUNIDADES program through reductions in risk behaviors and increased expectations.

6.3 Alternative models with expectations as covariates

Third, we estimated models of the form:

$$Outcomes = T + T_1 + X + expectations + u$$

where we instrumented T and T_1 as in the preferred model, but added expectations to check how that effect may be modifying the income and human capital effects for the main outcomes (smoking, drinking, and condom use). Even though expectations would be endogenous in the outcome equations, the purpose was to check the correlations sign and statistical significance. For the male and female samples combined, the higher expectation to finish high school was negatively and significantly correlated with lower likelihood of drinking alcohol and smoking. However, adding the expectation variable did not affect sexual initiation, or the use of condom at the first or at the last sexual intercourse.

6.4 Falsification tests

To check the robustness of our results we also used a series of falsification tests. We had a limited sample of 695 observations from previous waves of data collection before the urban OPORTUNIDADES program was fully operational. Using that data, the IVs worked well as before in the preferred model, in the first stage, but we found no significant effect of program participation or actual transfers on adolescent risk behaviors and expectations. The falsification test provided further evidence that the results presented were not merely a statistical construct.

6.5 Heckman correction models

To test the possible bias of using a two-stage least squares approach, we also used a selection correction model, or two-step Heckman model, with the same set and with an

expanded set of exclusion restrictions. The Heckman *lambda* term accounting for the endogeneity of treatment choice was negative and significant for smoking and alcohol use, providing evidence that indeed those adolescents more likely to participate in the program are also less likely to engage in smoking and drinking. Nevertheless, correcting for the selection bias, the program was protective, as in the preferred model.

6.6 Interactions

To provide further evidence of the causal path hypothesized, we used an interaction of "*beca*" (or scholarship) with program participation. The interaction term was coded zero for high school dropouts and those not yet in high school, and was one for those in high school, receiving the scholarship, and belonging to the OPORTUNIDADES program. The results showed that in the outcome equations with program participation, cash transfers treatments, and covariates, most of the protective effect on smoking and drinking for males was captured by the interaction term. Similarly, the increased high school graduation expectation for females was accounted almost entirely by the interaction term; program participation and actual transfers on their own became insignificant. This robustness check was, in spirit, similar to a regression discontinuity approach (Imbens & Lemieux 2008) given that time is a continuous variable and that the rules of the program were applied at the moment of high school enrollment. However, we did not pursuit that empirical strategy because the age at which young people enroll into high school was not fixed, and it was likely to be endogenous.

7. DISCUSSION

These estimation results suggest that conditional cash can potentially influence the risk behavior decisions of adolescents. Programs with conditional cash transfers designed to increase the current rewards of not engaging in risk behaviors such as smoking, drinking, sexual initiation and unprotected sexual intercourse may be worthwhile for reducing those risk behaviors.

This paper contributes to the growing body of economic literature evidence that conditional cash transfers programs in general, and the OPORTUNIDADES program in particular, can improve various child, adolescent and young adult health and education outcomes (Gertler 2004; Hoddinott & Skoufias 2004; Schultz 2004; Behrman & Hoddinott 2005; Behrman *et al.* 2005; Fernald *et al.* 2008b).

Empirically testing a simple theoretical model, this paper shows that, for female adolescents, participation in the OPORTUNIDADES program reduces consumption of tobacco and alcohol, and increases the expectation of finishing high school. Nevertheless, in the preferred IV model with both treatments included, program participation reduces risk behaviors, but higher levels of actual cash transfers tend to increase them. This is compatible with the theoretical model where an expectations effect can reduce risk behaviors, but where a short-term income effect can increase them.

Similarly, for males, testing the theoretical model shows that they are reducing the likelihood of smoking as a consequence of program participation, but again there is an offsetting effect which increases smoking as cash transfers increase. Nonetheless, the change in future expectations through education and better future outlook seems to be strong enough to counter the potentially harmful effects of additional liquidity and increased future earnings, which could increase alcohol and tobacco consumption under

unconstrained circumstances. The result is strongly corroborated with the higher expectation of graduating from high school, which we found using several model specifications.

Overall the CCT program reduced smoking in males by about 46 percent (from a prevalence of 29.85 percent without the program, to an adjusted prevalence of 16.03 for OPORTUNIDADES beneficiaries). Similarly, the program reduced alcohol use in females by 40 percent (from a 22.04 percent prevalence in non-beneficiaries to an adjusted prevalence of 13.28 percent). Most of the effect seems to have been channeled through the increased years of schooling expectation variable; which for instance, increased by 16 percent for males.

CCT programs can increase the price (or "real cost") of engaging in risk behaviors during adolescence, and as such we hypothesized and showed that demand for some of those behaviors (smoking and drinking, in particular) can decrease. Nevertheless, the decision to become sexually active and whether or not to use a condom during the first sexual intercourse, as well as the last sexual intercourse, seems to be made without considering CCT. Other influences seem to be stronger: we found no evidence that OPORTUNIDADES affects sexual initiation, or condom use for males or females.

The findings are of considerable importance as they suggest that the OPORTUNIDADES program plays a significant role in determining some of the risk behaviors of young males and females, who are among the most vulnerable in Mexico, and elsewhere. The reduction in risk behaviors has immediate and longer-term health impacts; but it will also have important longer-run effects on human development and poverty reduction, as young adolescents achieve higher educational goals.

7.1 Conclusion

In conclusion, testing an empirically tractable model of income, human capital and expectation effects, this paper analyzes self-reported risk behavior data (smoking, drinking, sexual initiation, and condom use), as well as future expectations (about high school completion). The data analyzed was collected, individually and confidentially, directly from adolescent participants in the largest conditional cash transfers program in Mexico: OPORTUNIDADES (formerly PROGRESA).

An important challenge for the estimation of an impact of the urban OPORTUNIDADES program on adolescent risk behaviors is that participating households, and thus adolescents therein, were self-selected into the program. Hence, particular characteristics that can make a family more likely to enroll can also determine the set of variables influencing risk behaviors and expectations for the future. We use instrumental variables (potential cumulative transfers, and the proportion of households at the block level where someone knew about the program) to predict treatment choice (program participation and cumulative transfers) independently of outcomes.

The results suggest that a CCT program can be protective against adolescent risk behaviors, particularly smoking and drinking. Relating it to the theoretical underpinnings presented in this paper, faced with higher human capital investment possibilities and a brighter future with more opportunities, adolescents in the CCT program seem to be choosing self-protective over risky behaviors. Circumventing the potential endogeneity problem, this paper shows that the OPORTUNIDADES program in Mexico reduces drinking and smoking, but it finds no effect on sexual initiation or condom use. The effect seems to be working through an increased expectation of high school graduation, for both males and females.

CCT programs such as OPORTUNIDADES need to continue emphasizing their health education and prevention components to ensure that the additional resources at the family level are not diverted to potentially harmful consumption of cigarettes, alcohol, or unprotected sexual intercourse. New and improved programs specifically targeted to adolescent health promotion and prevention may play a future role as important additional components in the overall CCT strategies.

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Appendix A: A Simple Model of the Impact of Conditional Cash Transfers on Adolescent Risk Behaviors: Comparative Statics

This model explores risk behavior decisions made by adolescents in a two-good, two-period model allowing an endogenous income effect (through cash transfers) and a human capital effect (through increased education investment). The specification includes a joint decision of current period risk behaviors and future consumption decision. Consider a lifetime utility function of the form:

$$v(C_1, R_1, C_2) \qquad \text{A-1}$$

with time separable, twice differentiable instant utility functions for times *t=1* and *t=2* (representing adolescence and adulthood, respectively) as follows:

$$u(C_1, R_1) + \delta u(C_2) \qquad \text{A-2}$$

where:
R_1 = the risk behaviors during adolescence;
C_1 = the adolescent consumption of all other goods; and
C_2 = the consumption of all other goods in adulthood.

The felicity functions have the usual basic properties:

$$\begin{aligned} & u' > 0, \quad u'' < 0 \\ & \lim_{c \to 0} \quad u'(c) = \infty \qquad \text{A-3} \\ & \lim_{c \to \infty} \quad u'(c) = 0 \end{aligned}$$

Making the assumption that adolescents live at home and that consumption at present time *t=1* is made by parents, and that there is no inter-temporal borrowing, consider the following maximization problem where the adolescent chooses the optimal level of risk behaviors and future consumption:

$$\begin{aligned} & Max \quad u(R_1) + \delta u(C_2) \\ & s.t. \quad C_1 = Y_1 + T_1 - PR_1 \qquad \text{A-4} \\ & \qquad C_2 = Y_2(E) - \phi(R_1) \end{aligned}$$

where
u = utility
R_1 = risk behaviors during adolescence, time *t=1*
C_1 = consumption of all other goods during adolescence
C_2 = consumption of all other goods during adulthood
δ = (subjective) discount rate, $0 < \delta \leq 1$
Y_1 = income at the household level at time *t=1*
T_1 = transfers at the household level at time *t=1*
P = current price of adolescent risk behaviors
Y_2 = income level during adulthood, time *t=2*
E = years of education
ϕ = adulthood costs of risk behaviors during adolescence

If we assume no inflation, and normalize prices of all other consumption goods C_1 and C_2 to equal to unity; then, the following Lagrangian gives the conditions for maximizing utility:

$$L = u(R_1) + \delta u(C_2) + \lambda[C_2 - Y_2(E) + \phi.\frac{1}{P}(C_1 - Y_1 - T_1)] \qquad \text{A-5}$$

Differentiating with respect to the three unknowns, R_1, C_1, and λ, and setting the resulting equations equal to zero, we obtain the first-order conditions for maximization:

$$\begin{aligned} \frac{\partial L}{\partial R_1} &= U_R + \lambda\phi = 0 \\ \frac{\partial L}{\partial C_2} &= \delta U_C + \lambda = 0 \\ \frac{\partial L}{\partial \lambda} &= C_2 - Y_2(E) + \frac{\phi}{P}[C_1 - Y_1 - T_1] \end{aligned} \qquad \text{A-6}$$

where by definition $U_R \equiv \frac{\partial u}{\partial R_1}$ and $U_C \equiv \frac{\partial u}{\partial C_2}$

A.1 Effects of a Change in the Subjective Discount Rate (δ)

To calculate the effect of a change in the subjective discount rate δ on adolescent risk behaviors R_1 we need to differentiate the system of equations (A-6) with respect to δ, which yields the following:

$$\begin{aligned} U_{RR}\frac{\partial R}{\partial \delta} + U_{RC}\frac{\partial C}{\partial \delta} + \lambda\phi\frac{\partial \lambda}{\partial \delta} &= 0 \\ \delta U_{CR}\frac{\partial R}{\partial \delta} + \delta U_{CC}\frac{\partial C}{\partial \delta} + \lambda\frac{\partial \lambda}{\partial \delta} &= -U_C \\ \phi\frac{\partial R}{\partial \delta} \quad + \qquad \frac{\partial C}{\partial \delta} \qquad &= 0 \end{aligned} \qquad \text{A-7}$$

Designating the determinant of the matrix of coefficients $|D|$, we have:

$$\begin{aligned} |D| &= \begin{vmatrix} U_{RR} & U_{RC} & \lambda\phi \\ \delta U_{CR} & \delta U_{CC} & \lambda \\ \phi & 1 & 0 \end{vmatrix} \\ &= -U_{RR}\lambda + U_{RC}\phi\lambda + \lambda\phi\delta U_{CR} - \lambda\phi^2\delta U_{CC} < 0 \end{aligned} \qquad \text{A-8}$$

where the last inequality follows since λ is necessarily negative (see A-6), and from the assumptions that U_{RR} and $U_{CC} < 0$ and that U_{RC} and $U_{CR} > 0$. Using Cramer's rule, we can solve for $\partial R / \partial \delta$ as follows:

$$\frac{\partial R}{\partial \delta} = \frac{\begin{vmatrix} 0 & U_{RC} & \lambda\phi \\ -U_C & \delta U_{CC} & \lambda \\ 0 & 1 & 0 \end{vmatrix}}{|D|} \qquad \text{A-9}$$

$$= \frac{\lambda\phi(-U_C)}{|D|} < 0$$

The last result shows that as the subjective discount factor δ increases towards unity (future cost discounting is decreased), adolescents would reduce risk behaviors.

A.2 Effects of a Change in Conditional Cash Transfers (T_1)

To calculate the effect of a change in the conditional cash transfers T_1 on adolescent risk behaviors R_1 we need to differentiate the system of equations (A-6) with respect to T_1, which yields the following:

$$\begin{aligned} U_{RR}\frac{\partial R}{\partial T_1} + U_{RC}\frac{\partial C}{\partial T_1} + \lambda\phi\frac{\partial \lambda}{\partial T_1} &= 0 \\ \delta U_{CR}\frac{\partial R}{\partial T_1} + \delta U_{CC}\frac{\partial C}{\partial T_1} + \lambda\frac{\partial \lambda}{\partial T_1} &= 0 \\ \phi\frac{\partial R}{\partial T_1} \quad + \qquad \frac{\partial C}{\partial T_1} \qquad &= \frac{\phi}{P} \end{aligned} \qquad \text{A-10}$$

Again using Cramer's rule,

$$\frac{\partial R}{\partial T_1} = \frac{\begin{vmatrix} 0 & U_{RC} & \lambda\phi \\ 0 & \delta U_{CC} & \lambda \\ \phi/P & 1 & 0 \end{vmatrix}}{|D|} \qquad \text{A-11}$$

$$= \frac{U_{RC}\lambda\phi/P + \delta U_{CC}\lambda\phi^2/P}{|D|}$$

which is of ambiguous sign. However note that $\frac{\partial R}{\partial T_1} > 0 \quad iff \quad \frac{\phi\lambda}{P}(u_{RC} + u_{CC}) < 0$; thus, a positive income effect implies that the second derivative of consumption utility has to be greater than the cross derivative of consumption and risk behavior utility.

A.3 Effects of a Change in Years of Education (E)

To calculate the effect of a change in the number of years of formal education (E) on adolescent risk behaviors R_1 we first note that education enters the equations only through adult income (Y_2). We differentiate the system of equations (A-6) with respect to E, yielding:

$$\begin{aligned} U_{RR}\frac{\partial R}{\partial E} + U_{RC}\frac{\partial C}{\partial E} + \lambda\phi\frac{\partial \lambda}{\partial E} &= 0 \\ \delta U_{CR}\frac{\partial R}{\partial E} + \delta U_{CC}\frac{\partial C}{\partial E} + \lambda\frac{\partial \lambda}{\partial E} &= 0 \\ \phi\frac{\partial R}{\partial E} \quad + \qquad \frac{\partial C}{\partial E} \qquad &= \frac{\partial Y_2^*}{\partial E} \end{aligned} \qquad \text{A-12}$$

Using Cramer's rule, we have

$$\begin{aligned} \frac{\partial R}{\partial E} &= \frac{\begin{vmatrix} 0 & U_{RC} & \lambda\phi \\ 0 & \delta U_{CC} & \lambda \\ \frac{\partial Y_2^*}{\partial E} & 1 & 0 \end{vmatrix}}{|D|} \\ &= \frac{U_{RC}\lambda\partial Y_2^*/\partial E - \delta U_{CC}\lambda\phi\partial Y_2^*/\partial E}{|D|} \end{aligned} \qquad \text{A-13}$$

which is unambiguously positive.

The model assumes that the variable years of education (E) is positively correlated with y_2. As years of formal education increase the model implies that consumption and income in the adult years will be higher. On the other hand, risk behaviors will linearly reduce consumption in adulthood due to losses in productivity, worse health outcomes, and lower schooling. The result implies that risk behaviors act as normal goods with future income.

Appendix B: Regression result tables with all covariates (for reviewers' only[2])

Table B2. First stage regressions: Models of OPORTUNIDADES program participation (T) and actual transfers (T1)

	All		Females		Males	
Instrumental Variables	T	T1	T	T1	T	T1
Log of potential cumulative transfers (z1a)	0.074**	0.955**	0.074**	0.954**	0.074**	0.956**
	[0.001]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
Proportion of households who know about OPORTUNIDADES (Census block level) (z2)	0.277**	0.262**	0.320**	0.253**	0.232**	0.279**
	[0.016]	[0.024]	[0.021]	[0.035]	[0.025]	[0.033]
Covariates						
Age	0.001	0.004	0.001	0.002	0.000	0.008
	[0.003]	[0.004]	[0.004]	[0.006]	[0.005]	[0.006]
Married or in civil union	-0.048*	-0.006	-0.036	-0.080*	-0.066*	0.099*
	[0.019]	[0.028]	[0.023]	[0.039]	[0.032]	[0.042]
Not completed primary	0.021	-0.069**	0.034	-0.046	0.004	-0.099**
	[0.016]	[0.024]	[0.021]	[0.034]	[0.025]	[0.032]
Number of friends to discuss personal problems with	-0.003+	0.003	-0.005+	0.009+	-0.002	-0.001
	[0.002]	[0.003]	[0.003]	[0.005]	[0.003]	[0.004]
Thinks at least one parent has problem with alcohol	0.028*	0.016	0.040*	0.065*	0.018	-0.036
	[0.013]	[0.018]	[0.016]	[0.027]	[0.019]	[0.025]
Number of siblings	0.003	-0.017	0.009	-0.008	0	-0.032*
	[0.007]	[0.011]	[0.009]	[0.015]	[0.012]	[0.015]
Has an older sister	0.015	0.011	0.016	0.005	0.014	0.02
	[0.015]	[0.022]	[0.019]	[0.032]	[0.023]	[0.029]
Has an older brother	-0.007	0.009	-0.026	-0.02	0.008	0.047
	[0.015]	[0.022]	[0.020]	[0.033]	[0.023]	[0.029]
Head of HH is female	-0.011	-0.003	0.001	-0.02	-0.02	0.023
	[0.016]	[0.024]	[0.020]	[0.034]	[0.027]	[0.034]
Head of HH's age	-0.001*	-0.003**	-0.001	-0.002*	-0.001+	-0.004**
	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Head of HH's education (in years)	-0.004*	-0.005*	-0.005*	-0.005	-0.003	-0.005
	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]
Head of HH speaks an indigenous language	0.003	0.01	0.026	0.017	-0.022	0.002
	[0.014]	[0.021]	[0.019]	[0.031]	[0.022]	[0.028]
Mother present	-0.043*	0.038	-0.053*	-0.006	-0.017	0.091*
	[0.019]	[0.028]	[0.024]	[0.040]	[0.032]	[0.041]
Father present	-0.008	0.003	0.006	-0.036	-0.02	0.048
	[0.016]	[0.024]	[0.021]	[0.034]	[0.026]	[0.033]
Spouse present	0.049	0.117	0.093	0.127	-0.086	-0.082
	[0.078]	[0.115]	[0.081]	[0.134]	[0.201]	[0.258]
Mother's education	-0.001	0.003	-0.001	0.005	0	0.001
	[0.002]	[0.003]	[0.002]	[0.004]	[0.003]	[0.004]
Log of family wealth ('000s pesos Nov 2002)	-0.008	-0.013	-0.01	-0.017	-0.006	-0.007
	[0.005]	[0.008]	[0.007]	[0.012]	[0.008]	[0.011]
Female	0.018+	-0.012				
	[0.010]	[0.014]				
Constant	-0.003	-0.05	-0.062	0.028	0.163	0.026
	[0.105]	[0.154]	[0.122]	[0.201]	[0.230]	[0.295]
F-statistic of excluded instruments	3637	210000	2216	97495	1475	120000
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Observations	3217	3217	1699	1699	1518	1518
R-squared	0.705	0.993	0.737	0.992	0.674	0.994

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

[2] The table numbers in Appendix B correspond to the main summary tables in the body of the manuscript.

Table B3a. Naive effect of OPORTUNIDADES participation on risk behaviors & expectations, females

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Household took up OPORTUNIDADES program	-0.008	**-0.047***	-0.012	0.084	-0.025	-0.008
	[0.013]	[0.020]	[0.067]	[0.066]	[0.044]	[0.058]
Age	0.009*	0.032**	0.032	-0.01	-0.008	-0.077**
	[0.004]	[0.006]	[0.020]	[0.020]	[0.014]	[0.018]
Married or in civil union	-0.043+	-0.097**	0.432**	-0.082	-0.170**	-0.467**
	[0.023]	[0.037]	[0.068]	[0.068]	[0.057]	[0.110]
Not completed primary	-0.022	-0.026	0.031	-0.095	-0.07	-0.573**
	[0.020]	[0.032]	[0.100]	[0.096]	[0.053]	[0.094]
Number of friends to discuss personal problems with	0.005+	0.003	-0.008	0.019	-0.001	0.042**
	[0.003]	[0.004]	[0.013]	[0.013]	[0.010]	[0.012]
Thinks at least one parent has problem with alcohol	0.036*	0.055*	-0.017	0.058	0.038	-0.082
	[0.016]	[0.026]	[0.072]	[0.071]	[0.052]	[0.075]
Number of siblings	-0.009	-0.013	0.029	-0.044	0.009	0.007
	[0.009]	[0.015]	[0.045]	[0.044]	[0.030]	[0.045]
Has an older sister	0.01	0.043	0.113	-0.066	-0.015	-0.059
	[0.019]	[0.030]	[0.114]	[0.112]	[0.091]	[0.089]
Has an older brother	0.002	0.023	-0.046	0.115	-0.005	-0.149+
	[0.019]	[0.031]	[0.099]	[0.098]	[0.072]	[0.091]
Head of HH is female	-0.012	0.005	-0.044	0.073	0.046	0.13
	[0.020]	[0.032]	[0.089]	[0.089]	[0.065]	[0.093]
Head of HH's age	0.000	0.000	-0.005	0.003	-0.001	0.006*
	[0.001]	[0.001]	[0.003]	[0.003]	[0.002]	[0.003]
Head of HH's education (in years)	0.003	-0.003	-0.026*	0.015	0.007	0.034**
	[0.002]	[0.003]	[0.011]	[0.011]	[0.007]	[0.010]
Mother present	0.016	0.047	-0.125	0.003	-0.064	-0.126
	[0.024]	[0.038]	[0.101]	[0.101]	[0.075]	[0.110]
Father present	-0.036+	-0.031	-0.084	0.193*	0.032	-0.043
	[0.021]	[0.033]	[0.093]	[0.093]	[0.077]	[0.094]
Spouse present	-0.12	0.014	-0.172	-0.365	-0.061	-0.102
	[0.074]	[0.118]	[0.227]	[0.228]	[0.113]	[0.363]
Mother's education	-0.002	0.005	0.023+	0.002	-0.011	0.034**
	[0.002]	[0.004]	[0.013]	[0.013]	[0.011]	[0.011]
Log of family wealth ('000s pesos Nov 2002)	0.005	0.021+	0.019	0.018	0.013	-0.011
	[0.007]	[0.011]	[0.037]	[0.037]	[0.022]	[0.033]
Constant	0.003	-0.494**	0.213	0.408	0.452	3.576**
	[0.115]	[0.184]	[0.509]	[0.506]	[0.349]	[0.551]
Observations	1749	1755	212	215	355	1430
R-squared	0.019	0.039	0.325	0.142	0.054	0.146

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B3b. Naive effect of OPORTUNIDADES participation on risk behaviors & expectations, males

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Household took up OPORTUNIDADES program	**-0.040+**	**-0.063****	0.012	-0.021	0.054	**0.125***
	[0.023]	[0.024]	[0.063]	[0.070]	[0.052]	[0.060]
Age	0.054**	0.073**	0.055**	-0.014	-0.025	-0.081**
	[0.007]	[0.007]	[0.021]	[0.022]	[0.017]	[0.019]
Married or in civil union	0.103*	0.045	0.429**	-0.229*	-0.273**	-0.232+
	[0.048]	[0.052]	[0.084]	[0.097]	[0.060]	[0.130]
Not completed primary	0.068+	0.051	0.06	-0.084	-0.152*	-0.561**
	[0.037]	[0.040]	[0.095]	[0.105]	[0.070]	[0.099]
Number of friends to discuss personal problems with	0.004	0.005	-0.004	-0.012	0.016	0.021+
	[0.004]	[0.005]	[0.015]	[0.016]	[0.015]	[0.011]
Thinks at least one parent has problem with alcohol	0.063*	0.090**	0.055	-0.013	0.042	0.083
	[0.029]	[0.032]	[0.076]	[0.084]	[0.059]	[0.078]
Number of siblings	-0.040*	-0.024	0.045	0.031	-0.004	-0.006
	[0.018]	[0.019]	[0.046]	[0.052]	[0.032]	[0.048]
Has an older sister	0.074*	0.054	-0.043	0.011	0.001	-0.083
	[0.034]	[0.037]	[0.090]	[0.101]	[0.077]	[0.090]
Has an older brother	0.056+	0.023	-0.037	-0.032	-0.122	-0.113
	[0.034]	[0.037]	[0.101]	[0.112]	[0.094]	[0.090]
Head of HH is female	0.052	0.02	-0.106	0.002	0.118	0.022
	[0.040]	[0.043]	[0.120]	[0.136]	[0.083]	[0.106]
Head of HH's age	-0.001	0.001	0.003	0.006+	0.002	0.008*
	[0.001]	[0.001]	[0.003]	[0.004]	[0.002]	[0.003]
Head of HH's education (in years)	-0.005	-0.003	0.018	0.014	-0.005	0.040**
	[0.004]	[0.004]	[0.011]	[0.012]	[0.009]	[0.010]
Mother present	0.005	0.044	-0.163	-0.121	0.082	0.131
	[0.048]	[0.052]	[0.127]	[0.140]	[0.087]	[0.126]
Father present	-0.018	-0.025	-0.167	0.136	0.052	-0.028
	[0.039]	[0.042]	[0.119]	[0.134]	[0.084]	[0.101]
Spouse present	-0.034	0.143	0	0	0.013	0.101
	[0.308]	[0.334]	[0.000]	[0.000]	[0.316]	[0.765]
Mother's education	0.012**	0.005	-0.022+	0.004	0.001	0.011
	[0.004]	[0.005]	[0.012]	[0.013]	[0.010]	[0.011]
Log of family wealth ('000s pesos Nov 2002)	-0.006	0.021	-0.018	0.009	0.019	0
	[0.012]	[0.013]	[0.031]	[0.036]	[0.026]	[0.033]
Constant	-0.515	-1.152**	-0.385	0.421	0.865	3.004**
	[0.350]	[0.379]	[0.481]	[0.518]	[0.528]	[0.890]
Observations	1575	1577	227	233	339	1361
R-squared	0.075	0.102	0.265	0.074	0.178	0.086

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B4a. Naive effect of OPORTUNIDADES participation and transfers on risk behaviors & expectations, females

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Household took up OPORTUNIDADES program	0.026	**-0.068**	-0.068	**0.215**	0.059	0.041
	[0.023]	[0.037]+	[0.126]	[0.119]+	[0.076]	[0.107]
Log of cumulative actual transfers	**-0.004**	0.003	0.007	-0.016	-0.012	-0.006
	[0.002]+	[0.004]	[0.013]	[0.012]	[0.009]	[0.011]
Age	0.009	0.032	0.032	-0.011	-0.01	-0.077
	[0.004]*	[0.006]**	[0.020]	[0.020]	[0.014]	[0.018]**
Married or in civil union	-0.042	-0.097	0.43	-0.078	-0.167	-0.467
	[0.023]+	[0.037]**	[0.068]**	[0.068]	[0.057]**	[0.110]**
Not completed primary	-0.024	-0.025	0.035	-0.103	-0.073	-0.575
	[0.020]	[0.032]	[0.100]	[0.096]	[0.053]	[0.094]**
Number of friends to discuss personal problems with	0.005	0.003	-0.007	0.018	-0.001	0.043
	[0.003]+	[0.004]	[0.013]	[0.013]	[0.010]	[0.012]**
Thinks at least one parent has problem with alcohol	0.036	0.055	-0.016	0.052	0.036	-0.083
	[0.016]*	[0.026]*	[0.072]	[0.071]	[0.052]	[0.075]
Number of siblings	-0.008	-0.014	0.028	-0.043	0.013	0.008
	[0.009]	[0.015]	[0.045]	[0.044]	[0.030]	[0.045]
Has an older sister	0.008	0.044	0.112	-0.064	-0.022	-0.061
	[0.019]	[0.030]	[0.114]	[0.112]	[0.091]	[0.089]
Has an older brother	0.002	0.023	-0.041	0.104	-0.017	-0.15
	[0.019]	[0.031]	[0.099]	[0.098]	[0.072]	[0.091]+
Head of HH is female	-0.011	0.005	-0.043	0.07	0.047	0.131
	[0.020]	[0.032]	[0.089]	[0.089]	[0.065]	[0.093]
Head of HH's age	0.000	0.000	-0.005	0.003	-0.001	0.006
	[0.001]	[0.001]	[0.003]	[0.003]	[0.002]	[0.003]*
Head of HH's education (in years)	0.003	-0.002	-0.026	0.015	0.006	0.034
	[0.019]*	[0.030]**	[0.095]	[0.095]	[0.058]	[0.087]
Mother present	0.019	0.045	-0.129	0.009	-0.06	-0.122
	[0.020]+	[0.033]	[0.093]	[0.093]*	[0.077]	[0.095]
Spouse present	-0.125	0.017	-0.17	-0.368	-0.071	-0.113
	[0.074]+	[0.118]	[0.228]	[0.227]	[0.113]	[0.363]
Mother's education	-0.002	0.005	0.022	0.004	-0.011	0.034
	[0.002]	[0.004]	[0.013]+	[0.013]	[0.011]	[0.011]**
Log of family wealth ('000s pesos Nov 2002)	0.005	0.021	0.016	0.027	0.016	-0.011
	[0.007]	[0.011]+	[0.038]	[0.038]	[0.022]	[0.033]
Constant	0.019	-0.504	0.219	0.376	0.498	3.602
	[0.115]	[0.185]**	[0.510]	[0.506]	[0.350]	[0.553]**
Observations	1749	1755	212	215	355	1430
R-squared	0.02	0.04	0.33	0.15	0.06	0.15

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B4b. Naive effect of OPORTUNIDADES participation and transfers on risk behaviors & expectations, males

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
Household took up OPORTUNIDADES program	-0.023	-0.033	-0.099	-0.068	0.033	-0.038
	[0.038]	[0.042]	[0.101]	[0.109]	[0.087]	[0.102]
Log of cumulative actual transfers	-0.002	-0.004	0.015	0.006	0.003	**0.022***
	[0.004]	[0.004]	[0.011]	[0.012]	[0.009]	[0.011]
Age	0.054**	0.072**	0.053*	-0.014	-0.025	-0.080**
	[0.007]	[0.007]	[0.021]	[0.022]	[0.017]	[0.019]
Married or in civil union	0.104*	0.047	0.421**	-0.233*	-0.275**	-0.241+
	[0.048]	[0.052]	[0.084]	[0.097]	[0.060]	[0.130]
Not completed primary	0.068+	0.051	0.054	-0.086	-0.152*	-0.560**
	[0.037]	[0.040]	[0.094]	[0.106]	[0.070]	[0.099]
Number of friends to discuss personal problems with	0.004	0.006	-0.004	-0.012	0.017	0.020+
	[0.004]	[0.005]	[0.014]	[0.016]	[0.015]	[0.011]
Thinks at least one parent has problem with alcohol	0.063*	0.090**	0.061	-0.011	0.043	0.085
	[0.029]	[0.032]	[0.076]	[0.084]	[0.060]	[0.078]
Number of siblings	-0.040*	-0.024	0.045	0.03	-0.005	-0.007
	[0.018]	[0.019]	[0.046]	[0.052]	[0.032]	[0.048]
Has an older sister	0.074*	0.053	-0.033	0.016	0.001	-0.083
	[0.034]	[0.037]	[0.090]	[0.101]	[0.077]	[0.090]
Has an older brother	0.056+	0.023	-0.045	-0.034	-0.123	-0.116
	[0.034]	[0.037]	[0.101]	[0.112]	[0.094]	[0.090]
Head of HH is female	0.053	0.02	-0.09	0.008	0.117	0.018
	[0.040]	[0.043]	[0.121]	[0.136]	[0.083]	[0.105]
Head of HH's age	-0.001	0.001	0.002	0.006	0.001	0.008*
	[0.001]	[0.001]	[0.003]	[0.004]	[0.002]	[0.003]
Head of HH's education (in years)	-0.005	-0.003	0.018	0.014	-0.005	0.041**
	[0.033]	[0.036]	[0.090]	[0.101]	[0.079]	[0.088]
Mother present	0.007	0.047	-0.179	-0.126	0.081	0.114
	[0.039]	[0.042]	[0.119]	[0.135]	[0.084]	[0.101]
Spouse present	-0.032	0.147	0	0	0.007	0.076
	[0.308]	[0.334]	[0.000]	[0.000]	[0.317]	[0.764]
Mother's education	0.012**	0.005	-0.022+	0.004	0.001	0.011
	[0.004]	[0.005]	[0.012]	[0.013]	[0.010]	[0.011]
Log of family wealth ('000s pesos Nov 2002)	-0.006	0.021	-0.021	0.008	0.018	0.002
	[0.012]	[0.013]	[0.031]	[0.036]	[0.026]	[0.033]
Constant	-0.512	-1.147**	-0.365	0.414	0.872	2.975**
	[0.350]	[0.379]	[0.480]	[0.519]	[0.529]	[0.889]
Observations	1575	1577	227	233	339	1361
R-squared	0.075	0.102	0.272	0.075	0.178	0.088

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B5a. Instrumental variables effect of OPORTUNIDADES participation on risk behaviors & expectations, females

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
IV for HH enrollment into OPORTUNIDADES program	**-0.030***	**-0.050***	0.022	0.045	-0.038	0.008
	[0.015]	[0.024]	[0.075]	[0.076]	[0.050]	[0.069]
Age	0.009**	0.034**	0.032+	-0.012	-0.009	-0.070**
	[0.004]	[0.006]	[0.019]	[0.019]	[0.014]	[0.018]
Married or in civil union	-0.043+	-0.100**	0.425**	-0.09	-0.167**	-0.482**
	[0.023]	[0.037]	[0.065]	[0.065]	[0.055]	[0.110]
Not completed primary	-0.016	-0.02	0.019	-0.098	-0.083	-0.578**
	[0.020]	[0.033]	[0.095]	[0.092]	[0.052]	[0.095]
Number of friends to discuss personal problems with	0.006*	0.004	-0.011	0.016	0	0.047**
	[0.003]	[0.004]	[0.012]	[0.013]	[0.010]	[0.012]
Thinks at least one parent has problem with alcohol	0.030+	0.054*	-0.004	0.061	0.044	-0.07
	[0.016]	[0.026]	[0.070]	[0.069]	[0.051]	[0.076]
Number of siblings	-0.01	-0.018	0.030	-0.046	0.003	0.013
	[0.009]	[0.015]	[0.043]	[0.043]	[0.030]	[0.045]
Has an older sister	0.011	0.046	0.101	-0.064	-0.008	-0.068
	[0.019]	[0.031]	[0.110]	[0.108]	[0.089]	[0.089]
Has an older brother	0.003	0.033	-0.053	0.119	0.004	-0.175+
	[0.019]	[0.031]	[0.094]	[0.094]	[0.070]	[0.091]
Head of HH is female	-0.006	0.005	-0.053	0.071	0.065	0.116
	[0.020]	[0.033]	[0.085]	[0.086]	[0.065]	[0.093]
Head of HH's age	0.000	0.000	-0.004	0.003	0.000	0.006*
	[0.001]	[0.001]	[0.003]	[0.003]	[0.002]	[0.003]
Head of HH's education (in years)	0.002	-0.003	-0.026*	0.013	0.008	0.032**
	[0.002]	[0.003]	[0.011]	[0.011]	[0.007]	[0.010]
Mother present	0.014	0.044	-0.13	-0.002	-0.064	-0.129
	[0.024]	[0.038]	[0.096]	[0.097]	[0.074]	[0.110]
Father present	-0.037+	-0.029	-0.097	0.192*	0.033	-0.043
	[0.020]	[0.033]	[0.089]	[0.090]	[0.076]	[0.094]
Spouse present	-0.150+	-0.009	-0.141	-0.228	-0.096	-0.056
	[0.079]	[0.129]	[0.251]	[0.253]	[0.120]	[0.408]
Mother's education	-0.001	0.006+	0.021+	-0.001	-0.01	0.036**
	[0.002]	[0.004]	[0.012]	[0.012]	[0.011]	[0.011]
Log of family wealth ('000s pesos Nov 2002)	0.007	0.022+	0.028	0.02	0.008	-0.018
	[0.007]	[0.012]	[0.036]	[0.036]	[0.022]	[0.034]
Constant	0.029	-0.490*	0.093	0.331	0.527	3.462**
	[0.120]	[0.193]	[0.501]	[0.499]	[0.348]	[0.586]
Observations	1691	1696	207	210	344	1384
R-squared	0.018	0.04	0.325	0.134	0.057	0.144

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B5b. Instrumental variables effect of OPORTUNIDADES participation on risk behaviors & expectations, males

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
IV for HH enrollment into OPORTUNIDADES program	**-0.052+**	**-0.072***	0.066	0.017	0.068	**0.212****
	[0.028]	[0.030]	[0.076]	[0.085]	[0.064]	[0.074]
Age	0.053**	0.075**	0.054**	-0.01	-0.027	-0.077**
	[0.007]	[0.007]	[0.020]	[0.021]	[0.017]	[0.019]
Married or in civil union	0.095+	0.032	0.448**	-0.292**	-0.262**	-0.233+
	[0.050]	[0.053]	[0.085]	[0.098]	[0.061]	[0.135]
Not completed primary	0.067+	0.044	0.048	-0.039	-0.152*	-0.568**
	[0.038]	[0.041]	[0.092]	[0.102]	[0.072]	[0.100]
Number of friends to discuss personal problems with	0.004	0.006	-0.007	-0.012	0.013	0.019+
	[0.004]	[0.005]	[0.014]	[0.016]	[0.015]	[0.011]
Thinks at least one parent has problem with alcohol	0.059*	0.097**	0.06	-0.025	0.066	0.085
	[0.029]	[0.032]	[0.074]	[0.081]	[0.059]	[0.079]
Number of siblings	-0.039*	-0.023	0.054	0.042	0.000	-0.023
	[0.018]	[0.019]	[0.045]	[0.051]	[0.032]	[0.048]
Has an older sister	0.060+	0.044	-0.043	0.018	-0.030	-0.065
	[0.035]	[0.037]	[0.088]	[0.098]	[0.078]	[0.091]
Has an older brother	0.055	0.024	-0.037	-0.013	-0.108	-0.104
	[0.034]	[0.037]	[0.099]	[0.110]	[0.094]	[0.091]
Head of HH is female	0.053	0.024	-0.071	0.016	0.093	0.026
	[0.040]	[0.044]	[0.119]	[0.134]	[0.083]	[0.107]
Head of HH's age	-0.001	0.000	0.003	0.006+	0.001	0.008*
	[0.001]	[0.001]	[0.003]	[0.003]	[0.002]	[0.003]
Head of HH's education (in years)	-0.006	-0.004	0.014	0.015	-0.003	0.043**
	[0.004]	[0.004]	[0.011]	[0.012]	[0.009]	[0.011]
Mother present	-0.001	0.039	-0.187	-0.149	0.091	0.136
	[0.048]	[0.052]	[0.123]	[0.135]	[0.086]	[0.127]
Father present	-0.021	-0.015	-0.125	0.167	0.041	-0.028
	[0.039]	[0.042]	[0.117]	[0.132]	[0.083]	[0.102]
Spouse present	-0.043	0.134			0.002	0.109
	[0.307]	[0.331]			[0.309]	[0.760]
Mother's education	0.011**	0.006	-0.018	0.007	0.002	0.008
	[0.004]	[0.005]	[0.012]	[0.013]	[0.010]	[0.011]
Log of family wealth ('000s pesos Nov 2002)	-0.004	0.019	-0.012	0.015	0.014	-0.004
	[0.013]	[0.014]	[0.031]	[0.035]	[0.026]	[0.033]
Constant	-0.472	-1.154**	-0.488	0.223	0.944+	2.984**
	[0.350]	[0.378]	[0.463]	[0.503]	[0.522]	[0.889]
Observations	1511	1512	219	224	323	1300
R-squared	0.071	0.105	0.266	0.092	0.166	0.085

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B6a. Instrumental variables effect of OPORTUNIDADES participation & transfers on risk behaviors & expectations, females

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
IV for HH enrollment into OPORTUNIDADES program	**-0.195****	**-0.308****	0.061	0.274	0.173	**0.683***
	[0.071]	[0.112]	[0.388]	[0.389]	[0.172]	[0.300]
IV for the log of cumulative actual transfers	**0.015***	**0.024***	-0.004	-0.020	-0.021	**-0.064***
	[0.006]	[0.010]	[0.035]	[0.034]	[0.017]	[0.028]
Age	0.010**	0.035**	0.032+	-0.012	-0.013	-0.073**
	[0.004]	[0.006]	[0.019]	[0.019]	[0.014]	[0.018]
Married or in civil union	-0.048*	-0.108**	0.426**	-0.088	-0.164**	-0.470**
	[0.024]	[0.038]	[0.066]	[0.065]	[0.055]	[0.111]
Not completed primary	-0.008	-0.008	0.016	-0.118	-0.092+	-0.605**
	[0.021]	[0.034]	[0.102]	[0.097]	[0.053]	[0.097]
Number of friends to discuss personal problems with	0.005+	0.003	-0.012	0.014	0.000	0.050**
	[0.003]	[0.004]	[0.013]	[0.013]	[0.010]	[0.012]
Thinks at least one parent has problem with alcohol	0.035*	0.061*	-0.004	0.057	0.042	-0.094
	[0.017]	[0.027]	[0.070]	[0.069]	[0.051]	[0.078]
Number of siblings	-0.011	-0.019	0.030	-0.048	0.010	0.016
	[0.009]	[0.015]	[0.043]	[0.042]	[0.030]	[0.046]
Has an older sister	0.016	0.053+	0.101	-0.063	-0.024	-0.084
	[0.020]	[0.031]	[0.110]	[0.107]	[0.090]	[0.091]
Has an older brother	0.002	0.033	-0.057	0.099	-0.017	-0.177+
	[0.020]	[0.032]	[0.101]	[0.099]	[0.072]	[0.093]
Head of HH is female	-0.003	0.010	-0.054	0.058	0.057	0.104
	[0.021]	[0.033]	[0.088]	[0.088]	[0.065]	[0.094]
Head of HH's age	0.000	0.000	-0.004	0.003	-0.001	0.006*
	[0.001]	[0.001]	[0.003]	[0.003]	[0.002]	[0.003]
Head of HH's education (in years)	0.002	-0.004	-0.026*	0.015	0.007	0.034**
	[0.002]	[0.003]	[0.011]	[0.011]	[0.007]	[0.010]
Mother present	0.003	0.026	-0.129	0.000	-0.051	-0.077
	[0.025]	[0.040]	[0.097]	[0.096]	[0.075]	[0.114]
Father present	-0.035+	-0.026	-0.098	0.174+	0.020	-0.049
	[0.021]	[0.033]	[0.093]	[0.094]	[0.077]	[0.096]
Spouse present	-0.133	0.018	-0.145	-0.241	-0.122	-0.225
	[0.082]	[0.131]	[0.253]	[0.252]	[0.122]	[0.420]
Mother's education	-0.001	0.006+	0.022+	0.002	-0.008	0.037**
	[0.002]	[0.004]	[0.013]	[0.013]	[0.011]	[0.011]
Log of family wealth ('000s pesos Nov 2002)	0.006	0.022+	0.030	0.035	0.015	-0.014
	[0.007]	[0.012]	[0.042]	[0.043]	[0.023]	[0.034]
Constant	0.008	-0.526**	0.084	0.222	0.580+	3.615**
	[0.123]	[0.196]	[0.520]	[0.526]	[0.351]	[0.598]
Observations	1691	1696	207	210	344	1384
R-squared	0.033	0.018	0.323	0.144	0.056	0.120

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%

Table B6b. Instrumental variables effect of OPORTUNIDADES participation & transfers on risk behaviors & expectations, males

	Smokes	Drinks alcohol	Sexually active	Used condom during first sexual intercourse	Used condom during last sexual intercourse	Expects to graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)
IV for HH enrollment into OPORTUNIDADES program	**-0.497***	-0.209	-0.326	0.818	0.648	**1.308***
	[0.194]	[0.204]	[0.558]	[0.508]	[0.505]	[0.514]
IV for the log of cumulative actual transfers	**0.039***	0.012	0.034	-0.069	-0.051	**-0.098***
	[0.017]	[0.018]	[0.047]	[0.043]	[0.044]	[0.045]
Age	0.053**	0.075**	0.047*	-0.004	-0.019	-0.076**
	[0.007]	[0.008]	[0.023]	[0.025]	[0.020]	[0.020]
Married or in civil union	0.064	0.022	0.401**	-0.193	-0.221**	-0.150
	[0.054]	[0.056]	[0.109]	[0.128]	[0.075]	[0.148]
Not completed primary	0.074+	0.046	0.039	-0.031	-0.162*	-0.587**
	[0.040]	[0.042]	[0.094]	[0.118]	[0.078]	[0.107]
Number of friends to discuss personal problems with	0.003	0.005	-0.003	-0.021	0.005	0.023+
	[0.004]	[0.005]	[0.015]	[0.019]	[0.018]	[0.012]
Thinks at least one parent has problem with alcohol	0.072*	0.101**	0.070	-0.040	0.025	0.047
	[0.031]	[0.032]	[0.076]	[0.093]	[0.073]	[0.085]
Number of siblings	-0.039*	-0.023	0.075	0.006	-0.020	-0.034
	[0.019]	[0.019]	[0.055]	[0.062]	[0.039]	[0.051]
Has an older sister	0.063+	0.045	-0.037	0.012	-0.019	-0.066
	[0.036]	[0.037]	[0.089]	[0.112]	[0.085]	[0.097]
Has an older brother	0.057	0.026	-0.081	0.058	-0.083	-0.090
	[0.036]	[0.037]	[0.117]	[0.134]	[0.104]	[0.096]
Head of HH is female	0.050	0.024	-0.064	0.012	0.118	0.026
	[0.042]	[0.044]	[0.120]	[0.153]	[0.092]	[0.113]
Head of HH's age	-0.001	0.000	0.002	0.008+	0.003	0.008*
	[0.001]	[0.001]	[0.003]	[0.004]	[0.003]	[0.003]
Head of HH's education (in years)	-0.006	-0.004	0.013	0.016	-0.004	0.044**
	[0.004]	[0.004]	[0.011]	[0.014]	[0.010]	[0.011]
Mother present	-0.021	0.032	-0.223+	-0.106	0.066	0.197
	[0.051]	[0.053]	[0.134]	[0.157]	[0.095]	[0.138]
Father present	-0.028	-0.017	-0.105	0.139	0.064	-0.016
	[0.041]	[0.042]	[0.122]	[0.153]	[0.092]	[0.109]
Spouse present	-0.061	0.127	0.000	0.000	0.084	0.157
	[0.321]	[0.333]	0.000	0.000	[0.342]	[0.806]
Mother's education	0.011**	0.006	-0.021+	0.012	0.006	0.009
	[0.004]	[0.005]	[0.012]	[0.015]	[0.012]	[0.012]
Log of family wealth ('000s pesos Nov 2002)	-0.005	0.018	-0.016	0.025	0.021	-0.004
	[0.013]	[0.014]	[0.031]	[0.041]	[0.029]	[0.035]
Constant	-0.417	-1.136**	-0.313	0.042	0.641	2.845**
	[0.368]	[0.381]	[0.527]	[0.588]	[0.622]	[0.945]
Observations	1511	1512	219	224	323	1300
R-squared	-0.020	0.095	0.257	-0.196	0.024	-0.029

Standard errors in brackets: + significant at 10%; * significant at 5%; ** significant at 1%