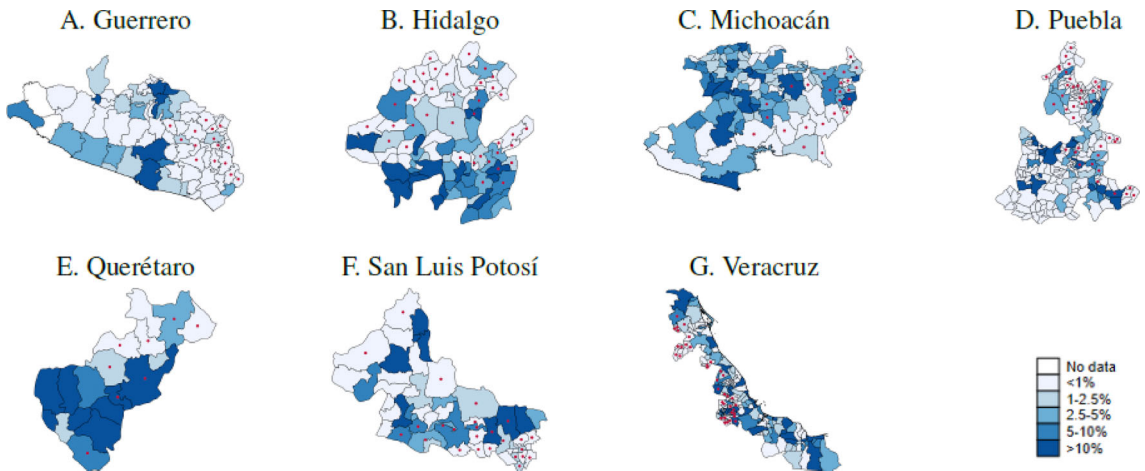


Supplementary Online Appendix
**Conditional Cash Transfers, Schooling Decisions, and Labor-Market
Conditions**

Teresa Molina  and **Joaquim Vidiella-Martin** 

S1. Additional Tables and Figures

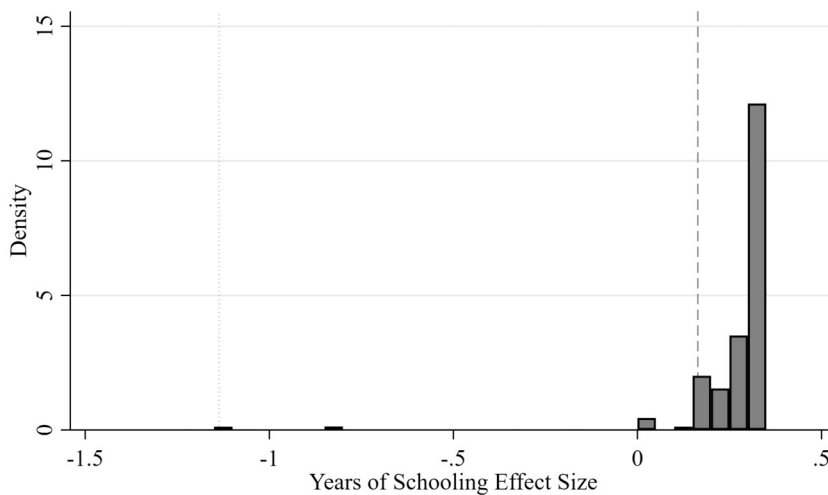
Figure S1.1. Share of Export-Oriented Manufacturing Jobs by Municipality, by State



Source: Authors' analysis based on Mexican Social Security Institute (IMSS) data.

Note: The map depicts the share of export-oriented manufacturing jobs in August 1997, before PROGRESA started, per municipality, relative to the working-age population (ages 15 to 49) in each municipality. Panels A to G depict each of the seven states where PROGRESA was implemented. The red markers indicate municipalities where PROGRESA took place.

Figure S1.2. Distribution of PROGRESA Schooling Effects



Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: This figure plots the distribution of PROGRESA treatment effects, calculated from the results of column 6 of [table 1](#). Estimates to the left of the dotted line or to the right of the dashed line are significantly different from zero at the 5 percent level.

Table S1.1. Summary Statistics for Individual and Household Characteristics, by Treatment Status and Export Exposure

Variable	Low-export areas			High-export areas		
	Mean		Difference	Mean		Difference
	(1) Treatment	(2) Control	(3) Treatment – control	(4) Treatment	(5) Control	(6) Treatment – control
Age	10.02 (3.33)	10.07 (3.34)	−0.04 (0.06)	9.93 (3.30)	9.87 (3.29)	0.06 (0.09)
Female	0.44 (0.50)	0.48 (0.50)	−0.04** (0.02)	0.57 (0.50)	0.52 (0.50)	0.04 (0.03)
Attending school	0.85 (0.35)	0.85 (0.36)	0.01 (0.01)	0.84 (0.37)	0.84 (0.37)	−0.00 (0.01)
Educational attainment	3.36 (2.69)	3.41 (2.80)	−0.05 (0.08)	3.43 (2.69)	3.37 (2.66)	0.06 (0.10)
N individuals	9,973	6,077	−	4,447	2,775	−
Household size	6.67 (2.14)	6.67 (2.13)	0.00 (0.08)	6.67 (2.22)	6.68 (2.22)	−0.01 (0.13)
Household head age	41.75 (11.91)	42.26 (12.28)	−0.50 (0.40)	41.90 (12.08)	42.68 (12.68)	−0.78 (0.80)
Female household head	0.07 (0.25)	0.07 (0.25)	0.00 (0.01)	0.07 (0.26)	0.08 (0.27)	−0.01 (0.01)
No. children aged 0–2	0.55 (0.66)	0.56 (0.67)	−0.00 (0.02)	0.54 (0.66)	0.52 (0.66)	0.02 (0.03)
No. children aged 3–5	0.73 (0.73)	0.73 (0.72)	0.00 (0.03)	0.74 (0.72)	0.74 (0.75)	0.01 (0.04)
No. females aged 6–7	0.26 (0.47)	0.26 (0.46)	0.00 (0.01)	0.29 (0.48)	0.31 (0.49)	−0.02 (0.02)
No. females aged 8–12	0.61 (0.73)	0.64 (0.74)	−0.03 (0.02)	0.68 (0.76)	0.67 (0.76)	0.01 (0.04)
No. females aged 8–12	0.50 (0.73)	0.51 (0.73)	−0.01 (0.02)	0.51 (0.71)	0.51 (0.73)	−0.01 (0.03)
No. males aged 6–7	0.29 (0.48)	0.28 (0.48)	0.01 (0.01)	0.26 (0.46)	0.29 (0.49)	−0.03 (0.02)
No. males aged 8–12	0.69 (0.76)	0.66 (0.73)	0.03 (0.02)	0.65 (0.74)	0.65 (0.77)	−0.00 (0.04)
No. males aged 13–18	0.56 (0.78)	0.54 (0.74)	0.02 (0.02)	0.52 (0.74)	0.52 (0.75)	−0.01 (0.03)
No. females aged 19–54	1.13 (0.51)	1.11 (0.51)	0.02 (0.02)	1.10 (0.53)	1.12 (0.52)	−0.02 (0.03)
No. females aged 55+	0.14 (0.36)	0.16 (0.38)	−0.01 (0.01)	0.15 (0.37)	0.15 (0.37)	−0.00 (0.01)
No. males aged 19–54	1.03 (0.55)	1.04 (0.53)	−0.01 (0.02)	1.05 (0.60)	1.01 (0.57)	0.04 (0.03)
No. males aged 55+	0.15 (0.37)	0.16 (0.37)	−0.01 (0.01)	0.17 (0.38)	0.17 (0.38)	0.00 (0.02)
Mother attended secondary school	0.05 (0.22)	0.06 (0.24)	−0.01 (0.01)	0.05 (0.21)	0.06 (0.24)	−0.01 (0.02)
Missing mother's education	0.38 (0.48)	0.41 (0.49)	−0.04 (0.03)	0.39 (0.49)	0.36 (0.48)	0.03 (0.04)
Father attended secondary school	0.07 (0.26)	0.07 (0.25)	0.01 (0.01)	0.06 (0.24)	0.07 (0.25)	−0.01 (0.01)
Missing father's education	0.32 (0.47)	0.33 (0.47)	−0.01 (0.03)	0.32 (0.47)	0.31 (0.46)	0.01 (0.03)

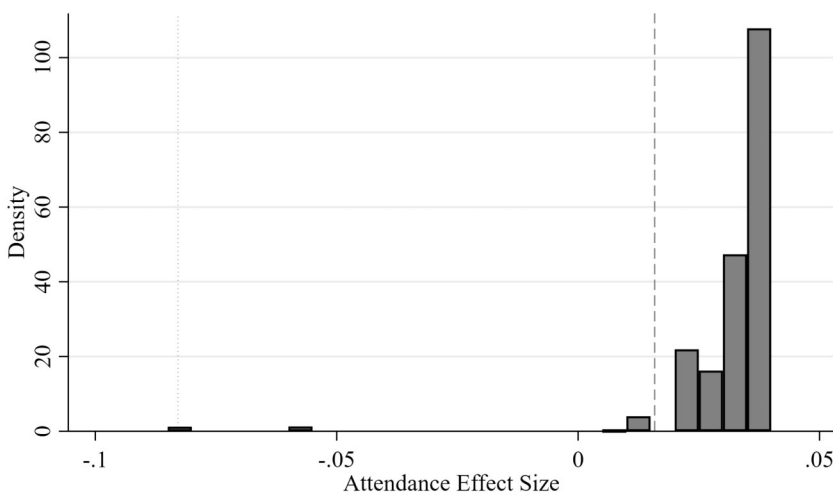
Table S1.1. Continued

Variable	Low-export areas			High-export areas		
	Mean		Difference	Mean		Difference
	(1) Treatment	(2) Control	(3) Treatment – control	(4) Treatment	(5) Control	(6) Treatment – control
Mother speaks indigenous lang.	0.45 (0.50)	0.52 (0.50)	-0.06 (0.07)	0.34 (0.47)	0.23 (0.42)	0.12 (0.08)
Missing mother’s language	0.02 (0.15)	0.03 (0.18)	-0.01** (0.00)	0.04 (0.20)	0.03 (0.17)	0.01 (0.01)
Father speaks indigenous lang.	0.46 (0.50)	0.52 (0.50)	-0.06 (0.07)	0.35 (0.48)	0.25 (0.43)	0.10 (0.08)
Missing father’s language	0.07 (0.25)	0.07 (0.25)	-0.00 (0.01)	0.07 (0.26)	0.08 (0.26)	-0.00 (0.01)
N households	3,582	2,178		1,580	956	

Source: Authors’ analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: Summary statistics calculated from the baseline survey, restricting to children aged 5–16 at baseline, with a non-missing educational attainment variable in 2003. We define low- (high-) export subdelegations as those with a share of export-oriented manufacturing jobs below (above) the median. We also test for the joint significance of differences in individual- and household-level characteristics, separately for low- and high-export areas. The *p*-values for the joint test of differences in individual and household characteristics in low-export areas are 0.204 and 0.467, respectively. In high-export areas, the *p*-values are 0.762 and 0.272 for individual- and household-level characteristics, respectively. Standard deviations (in columns 1, 2, 4, 5) and standard errors clustered at village level (in columns 3 and 6) in parentheses (* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01).

Figure S1.3. Distribution of PROGRESA Attendance Effects



Source: Authors’ analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: This figure plots the distribution of PROGRESA treatment effects, calculated from the results of column 6 of table 2. Estimates to the right of the dashed line are significantly different from zero at the 5 percent level.

Table S1.2. Heterogeneous Effects of PROGRESA on Educational Attainment, Using Overall Job Counts

	(1)	(2)	(3)	(4)	(5)	(6)
	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment
Treat × ExportJobs	−0.41 (0.18)**	−0.41 (0.18)**	−0.36 (0.14)***	−0.32 (0.15)**	−0.32 (0.15)**	−0.31 (0.12)***
Treat	0.15 (0.100)	0.20 (0.11)*	0.22 (0.11)**	0.15 (0.089)*	0.19 (0.099)*	0.20 (0.096)**
Treat × Female	–	−0.090 (0.084)	−0.089 (0.084)	–	−0.091 (0.083)	−0.090 (0.082)
Observations	23,272	23,272	23,272	23,272	23,272	23,272
Mean of DV	6.89	6.89	6.87	6.89	6.89	6.87
Controls	Basic	Basic	Basic	All	All	All
Weighted	No	No	Yes	No	No	Yes
<i>p</i> -value for sum	0.24	0.34	0.41	0.38	0.52	0.51

Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These regressions use the 2003 survey wave, restricting to children aged 5 to 16 at baseline (in 1997). Treat is an indicator for PROGRESA treatment villages. ExportJobs is the ratio of the total number of export-oriented jobs in the subdelegation in 1997, over the subdelegation's working-age population according to the 1990 census, standardized. "Basic" controls include gender, cohort fixed effects, and subdelegation fixed effects. "All" controls add household size, household head age, household head gender, as well as parental education and language dummies (including dummies for missing values). Weighted regressions use the attrition weights described in the empirical strategy section, and "*p*-value for sum" reports the *p*-value testing the null hypothesis that $\beta_1 + \beta_2 = 0$. Standard errors (clustered at village level) in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

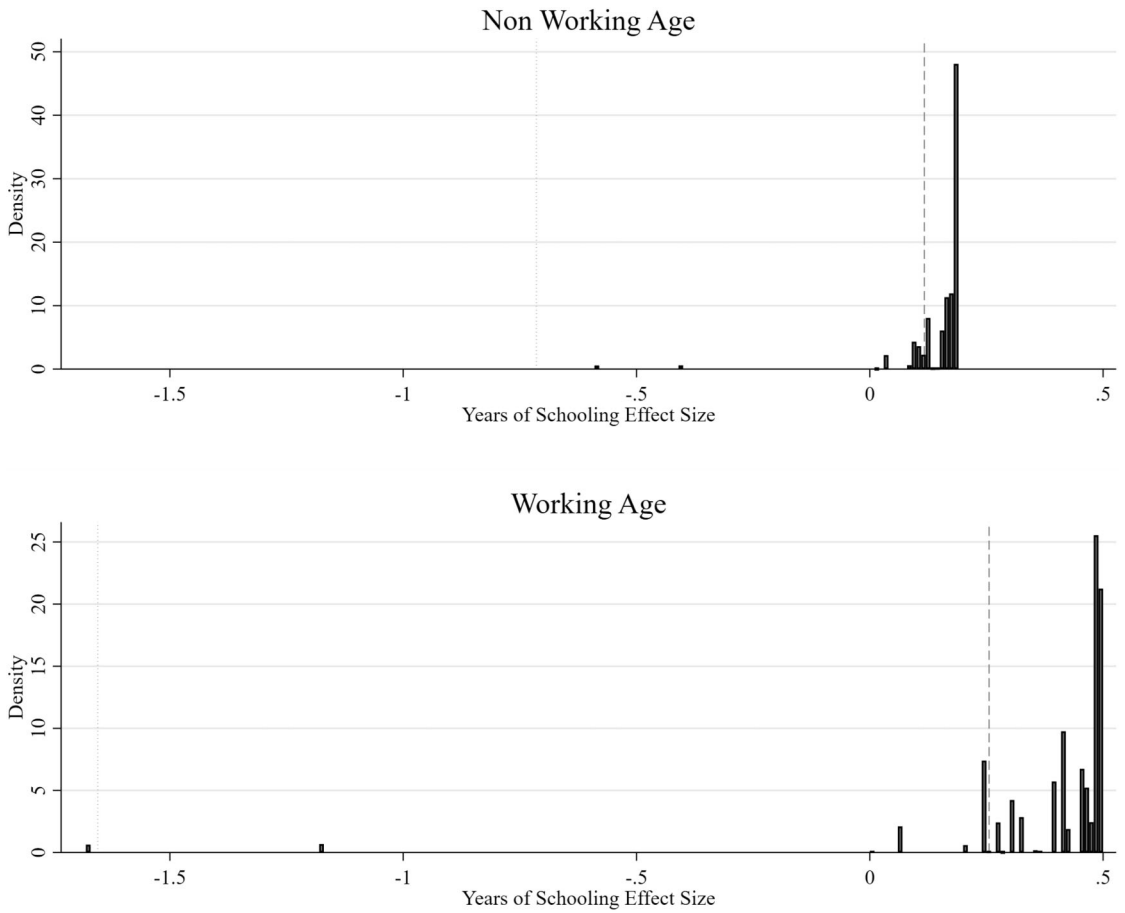
Table S1.3. Heterogeneous Effects of PROGRESA on School Attendance, Using Overall Job Counts

	(1)	(2)	(3)	(4)	(5)	(6)
	School attendance	School attendance	School attendance	School attendance	School attendance	School attendance
Treat × Post × ExportJobs	−0.018 (0.0082)**	−0.018 (0.0082)**	−0.019 (0.0066)***	−0.018 (0.0082)**	−0.018 (0.0082)**	−0.019 (0.0066)***
Treat × Post	0.030 (0.0059)***	0.027 (0.0078)***	0.027 (0.0078)***	0.030 (0.0059)***	0.026 (0.0078)***	0.027 (0.0078)***
Treat × ExportJobs	−0.0042 (0.012)	−0.0044 (0.012)	0.010 (0.010)	−0.0034 (0.012)	−0.0036 (0.012)	0.0090 (0.0097)
Post × ExportJobs	0.00036 (0.0037)	0.00034 (0.0037)	−0.00100 (0.0037)	0.00025 (0.0037)	0.00023 (0.0037)	−0.0012 (0.0037)
Treat	0.0044 (0.0078)	0.0052 (0.0087)	0.0096 (0.0086)	0.0037 (0.0076)	0.0045 (0.0084)	0.0082 (0.0083)
Observations	95,705	95,705	95,705	95,705	95,705	95,705
Mean of DV	0.83	0.83	0.83	0.83	0.83	0.83
Controls	Basic	Basic	Basic	All	All	All
Additional treatment interactions	None	By female	By female	None	By female	By female
Weighted	No	No	Yes	No	No	Yes
<i>p</i> -value for sum	0.27	0.46	0.47	0.30	0.50	0.45

Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These regressions use the 1997, 1998, and both 1999 survey waves, restricting to children aged 5 to 16 at baseline (in 1997). Treat is an indicator for PROGRESA treatment villages. ExportJobs is the ratio of the total number of export-oriented jobs in the subdelegation in 1997, over the subdelegation's working-age population according to the 1990 census, standardized. Post is an indicator for all waves after 1997. "Basic" controls include gender, cohort fixed effects, wave fixed effects, and subdelegation fixed effects. "All" controls add household size, household head age, household head gender, as well as parental education and language dummies (including dummies for missing values). "By female" treatment interactions include a female indicator interacted with Treat-by-Post (in all columns), in addition to a female indicator interacted with Treat and Post. Weighted regressions use the attrition weights described in the empirical strategy section, and "*p*-value for sum" reports the *p*-value testing the null hypothesis that $\alpha_1 + \alpha_2 = 0$. Standard errors (clustered at village level) in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

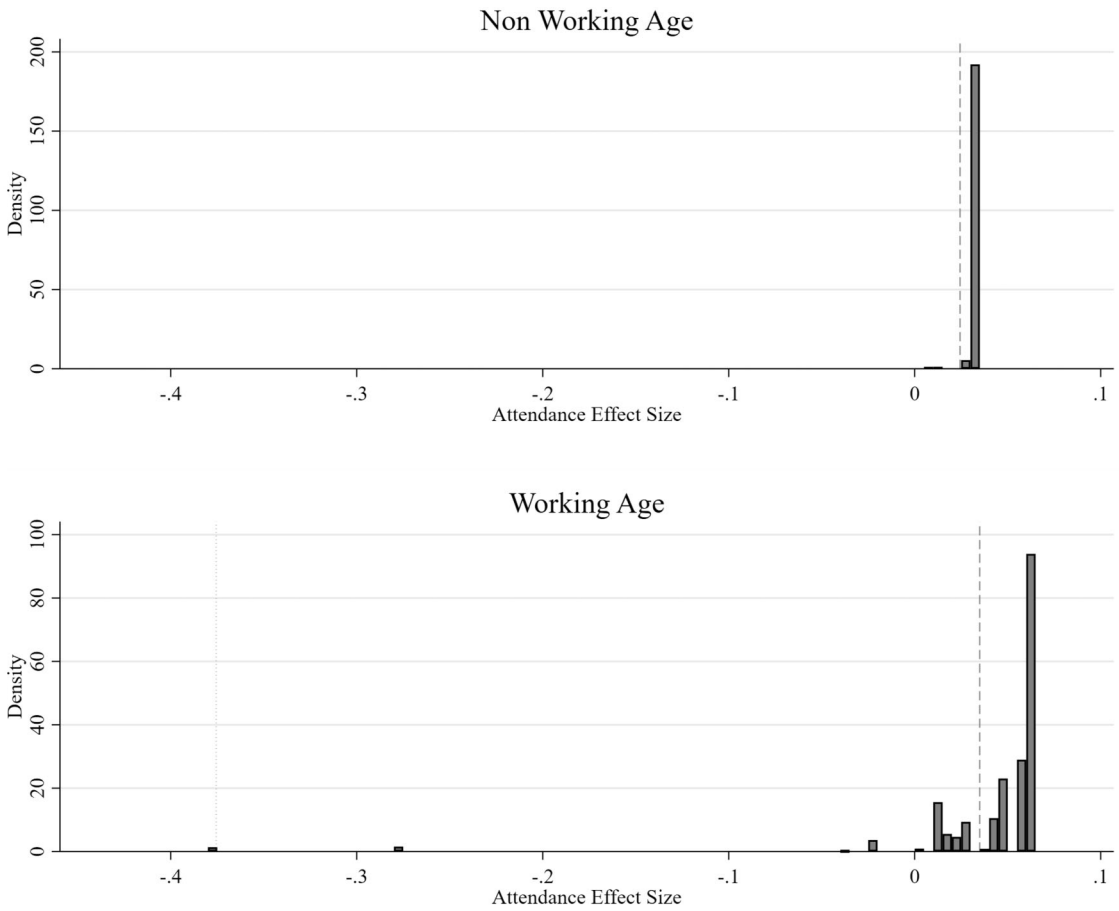
Figure S1.4. Distribution of PROGRESA Schooling Effects by Age



Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These figures plot the distribution of PROGRESA treatment effects separately for those younger than working age and those of working age, calculated from the results of columns 1 and 2 of [table 3](#). Estimates to the left of the dotted line or to the right of the dashed line are significantly different from zero at the 5 percent level.

Figure S1.5. Distribution of PROGRESA Attendance Effects by Age



Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These figures plot the distribution of PROGRESA treatment effects separately for those younger than working age and those of working age, calculated from the results of columns 3 and 4 of table 3. Estimates to the left of the dotted line or to the right of the dashed line are significantly different from zero at the 5 percent level. "Working age" is defined as those older than 15 (for educational attainment regressions) or those currently aged 15 or older (for attendance regressions).

Table S1.4. Sample Attrition

	(1) In 2003	(2) In 2003
Treat × ExportJobs	−0.056 (0.024)**	−0.054 (0.023)**
Treat	−0.026 (0.013)*	−0.028 (0.013)**
ExportJobs	0.012 (0.019)	0.0097 (0.018)
Observations	28,591	28,591
Mean of DV	0.814	0.814
Controls	Basic	All

Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These regressions restrict to children aged 5 to 16 at baseline (in 1997). The outcome variable is an indicator equal to 1 for individuals with a non-missing educational attainment variable in 2003. Treat is an indicator for PROGRESA treatment villages. ExportJobs is the ratio of the number of export-oriented jobs in the subdelegation in 1997, over the subdelegation's working-age population according to the 1990 census, standardized. "Basic" controls include gender, cohort fixed effects, and subdelegation fixed effects. "All" controls add household size, household head age, household head gender, as well as parental education and language dummies (including dummies for missing values). Standard errors (clustered at village level) in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table S1.5. Heterogeneous Effects of PROGRESA on Educational Attainment with Additional Interactions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment	Educational attainment
Treat × ExportJobs	-0.27 (0.13)**	-0.27 (0.13)**	-0.28 (0.13)**	-0.24 (0.13)*	-0.27 (0.13)**	-0.28 (0.13)**	-0.27 (0.13)**	-0.27 (0.14)*	-0.25 (0.13)*	-0.22 (0.14)
Treat	0.20 (0.100)**	0.20 (0.10)**	0.21 (0.10)**	0.21 (0.091)**	0.22 (0.097)**	0.056 (0.13)	0.21 (0.11)*	0.26 (0.099)**	0.21 (0.12)*	0.14 (0.15)
Treat × Female	-0.098 (0.083)	-0.098 (0.083)	-0.097 (0.083)	-0.071 (0.079)	-0.098 (0.083)	-0.099 (0.083)	-0.096 (0.083)	-0.098 (0.084)	-0.095 (0.083)	-0.071 (0.079)
Observations	23,272	23,272	23,272	23,272	23,272	23,272	23,272	23,272	23,272	23,272
Mean of DV	6.894	6.894	6.894	6.894	6.894	6.894	6.894	6.894	6.894	6.894
Controls	All	All	All	All	All	All	All	All	All	All
Additional treatment	Schooling	Income	Urban	OwnSchool	Migration	LaborIncome	FatherOcc	MotherOcc	SiblingWork	All
Interactions	(Census avg)	(Census avg)	(Census avg)	(Individual)	(Household)	(Household)	(Household)	(Household)	(Household)	All

Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These regressions use the 2003 survey wave, restricting to children aged 5 to 16 at baseline (in 1997). Treat is an indicator for PROGRESA treatment villages. ExportJobs is the ratio of the number of export-oriented jobs in the subdelegation in 1997, over the subdelegation's working-age population according to the 1990 census, standardized. "All" controls include gender, cohort fixed effects, subdelegation fixed effects, a female-by-treatment interaction, household size, household head age, household head gender, as well as parental education and language dummies (including dummies for missing values). All "Additional treatment interactions" are included as a main effect (if not collinear with other variables in the regression) and an interaction with Treat. Continuous variables used as additional treatment interactions are standardized (with the exception of labor income, which is included as a log), and missing values are replaced by the sample mean. Categorical variables are included as multiple dummy variable interactions, including a dummy for missing values; the omitted category is the modal category. Standard errors (clustered at village level) in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table S1.6. Heterogeneous Effects of PROGRESA on School Attendance with Additional Interactions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	School attendance	School attendance	School attendance	School attendance	School attendance	School attendance	School attendance	School attendance	School attendance	School attendance
Treated × Post × ExportJobs	-0.022 (0.0093)**	-0.023 (0.0096)**	-0.025 (0.010)**	-0.020 (0.0091)**	-0.021 (0.0088)**	-0.021 (0.0090)**	-0.020 (0.0089)**	-0.021 (0.0090)**	-0.019 (0.0088)**	-0.024 (0.011)**
Treated × Post	0.030 (0.0083)**	0.031 (0.0083)**	0.032 (0.0085)**	0.032 (0.0085)**	0.030 (0.0082)**	0.020 (0.0097)**	0.030 (0.0086)**	0.031 (0.0082)**	0.033 (0.0090)**	0.035 (0.011)**
Treated × Post × Female	0.0086	0.0086	0.0086	0.0090	0.0085	0.0086	0.0088	0.0087	0.0090	0.0092
Observations	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705	(0.0061) 95,705
Mean of DV	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833
Controls	All	All	All	All	All	All	All	All	All	All
Additional treatment Interactions	Schooling (Census avg)	Income (Census avg)	Urban (Census avg)	OwnSchool (Individual)	Migration (Household)	LaborIncome (Household)	FatherOcc (Household)	MotherOcc (Household)	SiblingWork (Household)	All

Source: Authors' analysis based on PROGRESA and Mexican Social Security Institute (IMSS) data.

Note: These regressions use the 1997, 1998, and both 1999 survey waves, restricting to children aged 5 to 16 at baseline (in 1997). Treated = 1 if a village has PROGRESA at the time of the survey. ExportJobs is the ratio of the number of export-oriented jobs in the subdelegation in 1997, over the subdelegation's working-age population according to the 1990 census, standardized. Post is an indicator for all waves after 1997. "All" controls include gender, cohort fixed effects, wave fixed effects, subdelegation fixed effects, a female indicator interacted with Treated-by-Post, household size, household head age, household head gender, as well as parental education and language dummies (including dummies for missing values). All "Additional treatment interactions" are included as a main effect (if not collinear with other variables in the regression) and an interaction with Treated-by-Post. Continuous variables used as additional treatment interactions are standardized (with the exception of labor income, which is included as a log), and missing values are replaced by the sample mean. Categorical variables are included as multiple dummy variables interactions, including a dummy for missing values; the omitted category is the modal category. Standard errors (clustered at village level) in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

S2. Simulations

Figure S2.1 illustrates the results of three simulations of the model in the theoretical framework section. In each panel, the two solid lines denote the marginal benefit and marginal cost functions, which are the left-hand side and right-hand side of equation (1), in a situation with no CCT. The intersection of the two solid lines, therefore, identifies the optimal amount of schooling without a CCT program. The dashed line depicts the marginal cost curve in the presence of a CCT program—it is lower than the original marginal cost curve and therefore results in a higher level of optimal schooling in all three panels.

We use panel A as our baseline case, a setting with very few export-oriented jobs. In this scenario, the optimal amount of schooling is 6.3 years without a CCT program, but 7.7 years with a CCT program. That is, a CCT program increases schooling by 1.4 years.

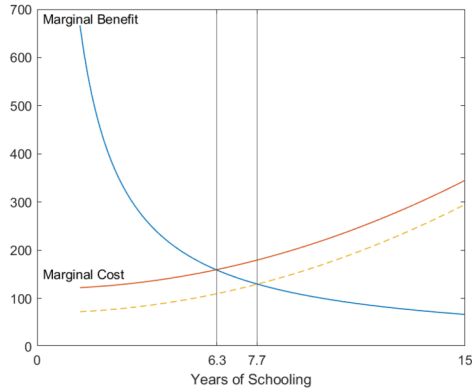
Using the same marginal benefit function, panels B and C illustrate two possible marginal cost curves for a setting with many export-oriented jobs. Because we know from Atkin (2016) that the expansion of export manufacturing led to lower levels of schooling, both of these panels depict a marginal cost curve that leads to a lower level of schooling without a CCT program than the baseline case: 5.5 years (compared to 6.3 years) in both cases.

Despite the fact that the marginal cost curves in panels B and C result in the same level of schooling in a scenario without a CCT program, the changes in schooling generated by a CCT program are different. In panel B, where the marginal cost curve is flatter, schooling increases by 1.9 years—more than in the baseline case. In panel C, however, where the marginal cost curve is steeper (reflecting a more convex cost function), schooling increases only by 1.1 years—the smallest increase across all three examples.

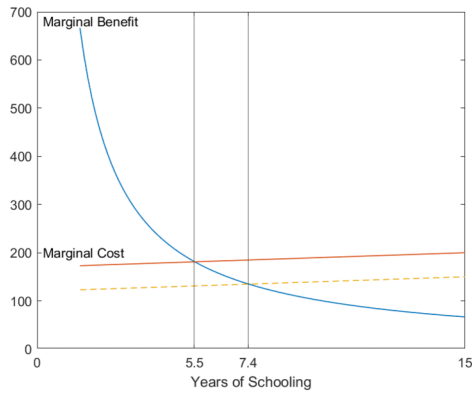
In short, the fact that export-oriented manufacturing led to lower levels of schooling in our setting does not allow us to predict whether it will increase or decrease the schooling impact of a CCT program in the same context.

Figure S2.1. Simulations of the Optimal Schooling Response to a Price Reduction

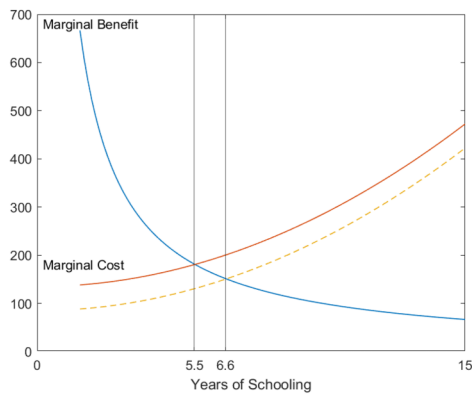
A. Baseline Case



B. Export Manufacturing Setting, Example 1



C. Export Manufacturing Setting, Example 2



Source: Authors' calculations.

Note: Marginal benefits and marginal costs (as a function of years of schooling, S) are defined as follows: Marginal benefit (in all panels): $MB(S) = 1000/S$. Marginal cost (panel A): $MC(S) = S^2 + 120$. Marginal cost (panel B): $MC(S) = 2S + 170$. Marginal cost (panel C): $MC(S) = 1.5S^2 + 135$.