

Housing, Health & Happiness

Matías D. Cattaneo, UC Berkeley

Sebastián Galiani, Un. San Andres

Paul Gertler, UC Berkeley & World Bank

Sebastián Martínez, World Bank

Rocío Titiunik, UC Berkeley

Housing along with food & water are considered basic needs

- Most countries devote substantial resources to
 - Slum upgrading
 - Improving housing quality
 - Existing housing & new housing
 - US spends more on housing than other welfare programs such as TANF (Olsen, 2003).
- Welfare effects
 - Quality of life and mental health
 - Environmental health
 - Air Quality, Parasites & Bacteria

Little work on welfare effects of housing: Economics

- Hedonic studies that estimate the market value of various housing improvements (e.g. Crane et al., 1997, Jimenez, 1983).
- CV/EV estimates of welfare gain from the parameters of household utility functions (e.g. Kaufman and Quigley 1987, Takeuchi et al., 2005).
- Katz et al. (2001) examine impacts of Δ s in residential neighborhoods on well being
 - families in high-poverty housing projects
 - received housing vouchers in random lottery

Health literature

- Thomson et al. (2001) Survey
- Critical of the existing literature
- Mainly cross-sectional correlations
- No experiments or quasi-experiments

Housing is a Priority in Mexico

- México allocates considerable resources for:
 - Housing for those without
 - Improving the quality of housing
 - Improving amenities (e.g. electricity, water, waste)
- Because
 - Housing key component of quality of life
 - Has effects on health and welfare
- Focus of new Gouvernement

Mexican program PISO FIRME:

- Replace dirt floors with cement
 - Dirt floors are a primary indicator of poverty
 - 13% (2.8 million) Mexican families live in houses with dirt floors
 - Almost all poor live in houses with dirt floors
- State of Coahuila
 - Northern Mexico
 - 5% had dirt floors in 2000



Preview of Results:

- Offering PISO FIRME increased cement floors
- Offering PISO FIRME on Child Health
 - Reduced diarrhea, parasites & anemia
 - Increased cognitive ability
- Offering PISO FIRME on Maternal Happiness
 - Reduced depression measure & perceived stress
 - Increased satisfaction with quality of life
- Having a cement floor had big effects

Today....

- Program
 - Characteristics
 - Objectives
- Analysis
 - Research questions
 - Identification strategy
 - Sampling & Measurement
- Results
- Conclusions

Program Characteristics

- Supply up to 50m sq of concrete
- Worth USD \$150
- Government supplies materials and family supplies labor
- Joint Fed/State Program
- Beneficiaries 2001-2005
 - 34,000 beneficiaries in Coahuila
 - 100% takeup
 - 284,000 nationwide

How the Program Works...

- Paso 1:

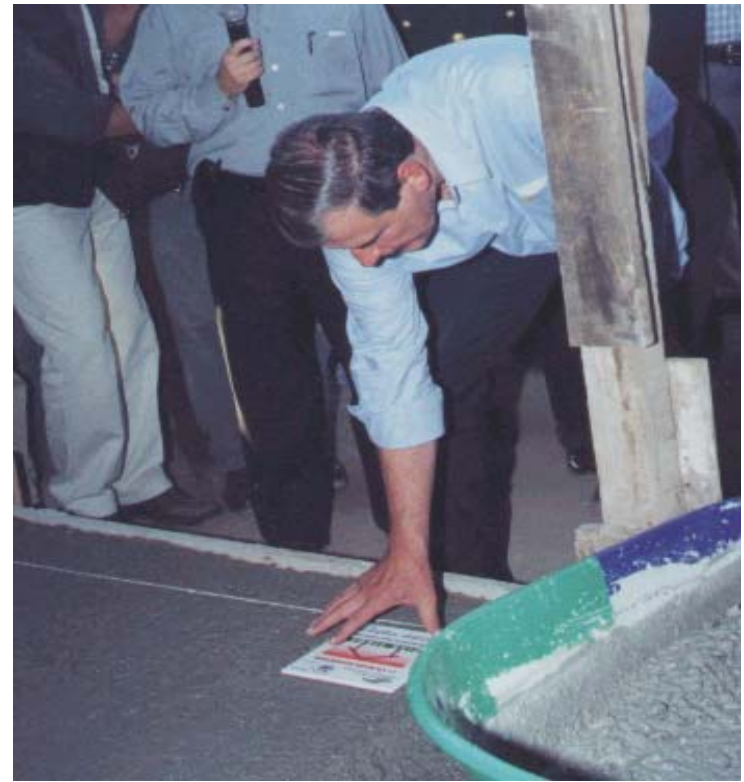


- Paso 2:



How the program works...

- After 4 hours...



Program Objectives I: Child Health

- **Interrupt transmission of parasitic infections**
(Walker et al, 1992 and Stephenson et al., 1990)
 - Parasites live in fecal matter
 - Dirt floors are hard to clean
 - Hard to see fecal matter on dirt floors
- **Expect large effect on young children**
 - Play on floors
 - Ingest fecal matter by putting hands in mouth
 - Don't understand consequences

Implications for child development

(Stephenson et al., 1990 and Gupta et al, 1997)

- Parasites are a major cause of gastrointestinal irritation and diarrhea
- Diarrhea reduces calorie absorption & physical growth
- Parasites also consume micronutrients, especially iron, which causes anemia
- Chronic anemia reduces cognitive development

Worldwide Intestinal Parasites Infect Over 3 Billion & Cause 3 Million Child Deaths

- Common interventions
 - Anti-worm drugs such as Ambendazol
 - Behavioral changes e.g wash hands
 - Safe water
- Mexico: Ambendazol
- Miguel & Kremer (2004) show deworming increased on school participation in Kenya.
- Ambendazol does not affect non-worm parasites i.e. amoeba / protozoa

Program Objectives II: Quality of life

- Question is how to measure it
 - unlikely to affect standard measures of welfare e.g. income/consumption
 - Willingness to pay (e.g. CV/EV/consumer surplus) from utility function estimates
 - Happiness (Di Tella & MacCulloch (2006); Kahneman & Krueger (2006))
- Happiness and mental health
 - Self-reported satisfaction with life
 - Depression
 - Stress

Ask Two Related Questions

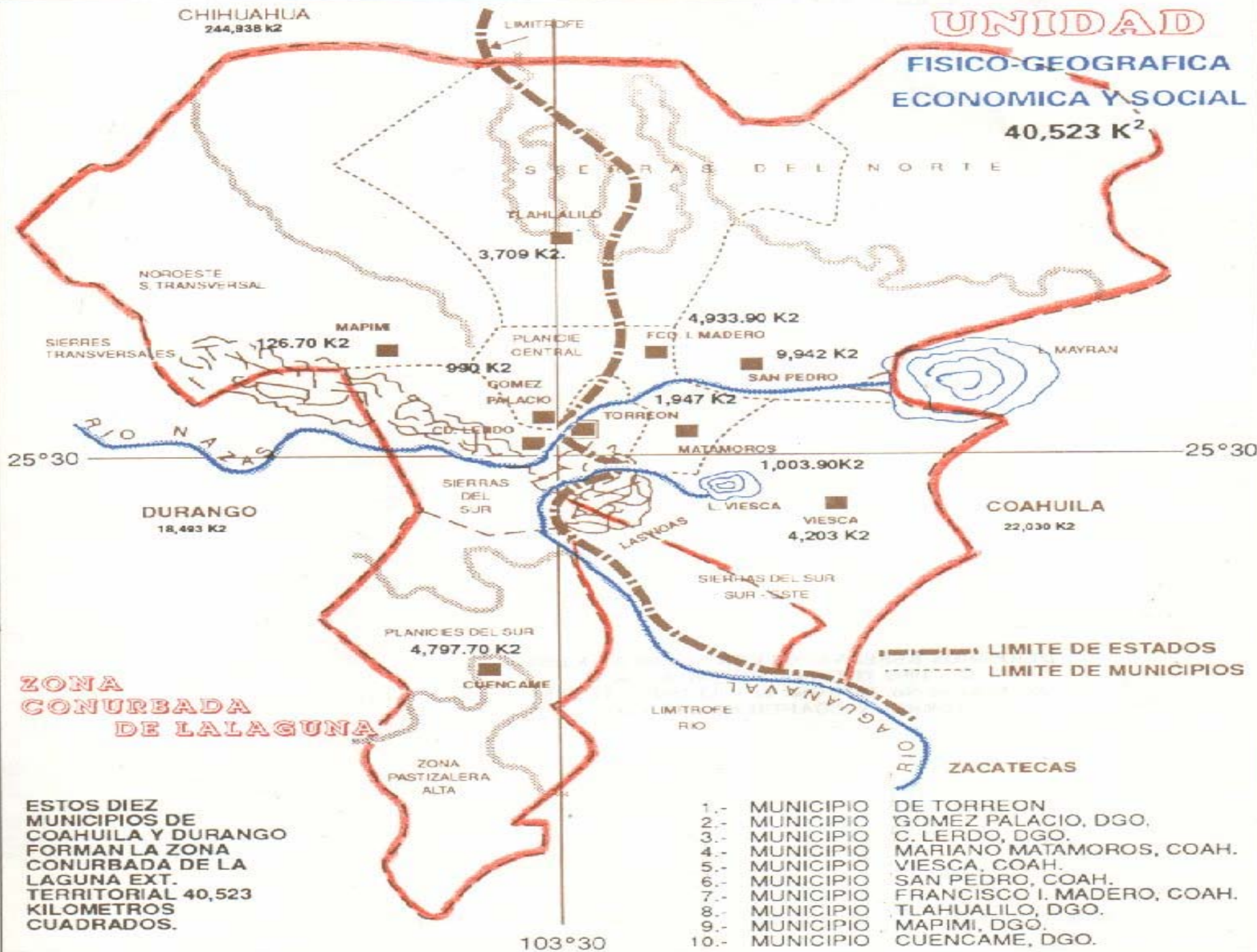
- Net effect of offering PISO FIRME
 - “Intent-to-Treat” (ITT) effects
- Effect of having hard floors
 - Use offering PISO FIRME as IV
 - LATE
- Outcomes of interest
 - child health and development
 - maternal happiness/mental health

Geographical Discontinuity

- State of Coahuila Implemented PISO FIRME, but neighbor Durango did not
- Twin cities of Torreón (Coahuila) and Gómez Palacios and Lerdo (Durango).
 - Separated by a river with many bridges
 - Effectively one city
 - Both have good municipal water & sewage
 - Both use Ambendozal to deworm
 - No other local child health/housing programs

CHIHUAHUA
244,938 K2

UNIDAD FISICO-GEOGRAFICA ECONOMICA Y SOCIAL 40,523 K²



3,709 K2.

4,933.90 K2

126.70 K2

9,942 K2

990 K2

1,947 K2

1,003.90K2

DURANGO
18,493 K2

COAHUILA
22,039 K2

4,203 K2

PLANICIES DEL SUR
4,797.70 K2

ZONA CONURBADA DE LALAGUNA

ZONA
PASTIZALERA
ALTA

--- LIMITE DE ESTADOS
- - - LIMITE DE MUNICIPIOS

ESTOS DIEZ
MUNICIPIOS DE
COAHUILA Y DURANGO
FORMAN LA ZONA
CONURBADA DE LA
LAGUNA EXT.
TERRITORIAL 40,523
KILOMETROS
CUADRADOS.

- 1.- MUNICIPIO DE TORREON
- 2.- MUNICIPIO GOMEZ PALACIO, DGO.
- 3.- MUNICIPIO C. LERDO, DGO.
- 4.- MUNICIPIO MARIANO MATAMOROS, COAH.
- 5.- MUNICIPIO VIESCA, COAH.
- 6.- MUNICIPIO SAN PEDRO, COAH.
- 7.- MUNICIPIO FRANCISCO I. MADERO, COAH.
- 8.- MUNICIPIO TLAHUALILO, DGO.
- 9.- MUNICIPIO MAPIMI, DGO.
- 10.- MUNICIPIO CUENCAME, DGO.

103°30

25°30

25°30

Sampling Strategy

- 1500 Treatments from Torreón
 - Received PF btw 2001-2004, min 2 year exposure
 - Random sampling census radius
 - All beneficiaries on block w/kids < age 6
- 1500 Controls from Gómez Palacios & Lerdo
 - Matched census blocks based on
 - proportion of households with dirt floor in 2000,
 - number of children between 0 and 5 years old in 2000
 - number of households in 2000
 - % of families in poverty in 2000
 - households with dirt floor in 2000 & kids < age 6

Survey Content & Measurement

- demographics & socio-economic status,
- housing infrastructure including floor type of each room
- Hygiene environment & habits
- Children < age 6
 - health outcomes,
 - nutritional outcomes,
 - cognitive development.
- Maternal happiness and mental health,

Child Outcomes

- Maternal reported
 - Diarrhea
 - Respiratory, other diseases
- Two stool samples to test for parasites
 - 21 different types of worms & protozoa
- Blood to test for anemia
- Height & Weight
- Picture Peabody Vocabulary Test (age 3-5)
 - percentile Latin American distribution

Maternal Happiness

- Depression scale based on
 - Sum of responses to 15 depression related questions
- Perceived stress scale
 - Sum of responses to 7 questions
- Satisfaction with
 - Flooring
 - Housing
 - Quality of Life
 - =1 if satisfied or very satisfied

Analysis outline

- Survey response rates
- Sample Balance
- Effect of PISO FIRME on cement floors
- Child Health
 - Intent to Treatment
 - Treatment on Treated
- Maternal Happiness
 - Intent to Treatment
 - Treatment on Treated

Survey Response Rates

- Target sample size of 3,000 households
- Treatments
 - 92.6% response rate
 - 1,390 completed surveys
- Comparisons
 - 92.9% response rate
 - 1,393 surveys

Table II: Difference of Means for Census Variables

Variable	Treatment Mean	Control Mean	Mean Difference
<i>Proportion of blocks of houses with at least one house that has dirt floor</i>	0.573	0.612	-0.040
<i>Proportion of households with dirt floors</i>	0.173	0.189	-0.016
<i>Average number of children between 0 and 5 yrs of age</i>	0.710	0.721	-0.011
<i>Number of households</i>	511.292	488.989	22.303
<i>Number of people</i>	2241.586	2170.597	70.989
<i>Average number of rooms per household</i>	2.352	2.353	-0.002
<i>Average number of people per household</i>	4.326	4.448	-0.122
<i>Proportion of households with no water connection outside the house</i>	0.076	0.043	0.033
<i>Proportion of households with no water connection inside the house</i>	0.392	0.316	0.076
<i>Proportion of households with no water connection in the bathroom</i>	0.507	0.451	0.056
<i>Proportion of households with no gas heater</i>	0.028	0.029	-0.001
<i>Proportion of households with no refrigerator</i>	0.204	0.212	-0.007
<i>Proportion of households with no washing machine</i>	0.379	0.359	0.020
<i>Proportion of households with no telephone</i>	0.804	0.786	0.018
<i>Proportion of households with no vehicle</i>	0.735	0.734	0.000
<i>Average overcrowding index</i>	2.302	2.314	-0.012
<i>Proportion of households below the poverty line</i>	0.140	0.148	-0.009
<i>Proportion of households with illiterate members</i>	0.063	0.059	0.004
<i>Average years of schooling of head of household</i>	6.386	6.514	-0.128
<i>Average number of school dropouts among children aged 5 - 15 yrs</i>	0.180	0.172	0.007
<i>Average number of household members who work</i>	1.508	1.592	-0.084
<i>Average number of family members who earn an income</i>	1.422	1.495	-0.072
<i>Number of observations</i>	599	370	

Table III: Difference of Means for Independent Variables

Variable	Observations Treatment	Mean Treatment	Observations Control	Mean Control	Mean Difference
Household Demographics					
<i>Number of household members</i>	1390	5.312	1393	5.374	-0.063
<i>Head of household's age</i>	1390	37.469	1393	37.120	0.349
<i>Head of household's years of schooling</i>	1388	6.115	1391	6.408	-0.293
<i>Spouse's age</i>	1390	29.643	1393	28.772	0.871
<i>Spouse's years of schooling</i>	1233	6.311	1211	6.479	-0.168
Characteristics of Children Aged 0-5					
<i>Age</i>	1980	2.649	2112	2.579	0.071
<i>Male (=1)</i>	1980	0.491	2112	0.517	-0.025
<i>Mother present (=1)</i>	1980	0.959	2112	0.943	0.015
<i>Mother's age (if present)</i>	1898	27.388	1992	27.465	-0.077
<i>Mother's years of schooling (if present)</i>	1896	7.029	1992	6.910	0.119
<i>Father present (=1)</i>	1980	0.764	2112	0.722	0.042
<i>Father's age (if present)</i>	1512	30.347	1525	30.632	-0.286
<i>Father's years of schooling (if present)</i>	1508	6.826	1519	7.153	-0.326
Housing Characteristics					
<i>Number of rooms</i>	1390	2.081	1393	1.981	0.100
<i>Water connection (=1)</i>	1390	0.968	1393	0.977	-0.009
<i>Water connection inside the house (=1)</i>	1390	0.512	1393	0.546	-0.034
<i>Share of rooms with cement floors in 2000</i>	1390	0.329	1393	0.327	0.002
Hygienic Environment					
<i>Household has animals on land (=1)</i>	1390	0.516	1393	0.480	0.036
<i>Animals allowed to enter the house (=1)</i>	1390	0.192	1393	0.190	0.003
<i>Number of times respondent washed hands the day before</i>	1390	3.748	1393	3.716	0.032
Economic Characteristics					
<i>Proportion of household members who work</i>	1389	0.285	1393	0.274	0.012
<i>Household operates a microenterprise (=1)</i>	1385	0.106	1387	0.095	0.011
<i>Hours worked by household members per capita</i>	1389	14.452	1393	14.566	-0.114
<i>Total household income per capita</i>	1390	1406.056	1393	1874.333	-468.278
<i>Total value of household assets per capita</i>	1389	22413.900	1393	22032.320	381.580
<i>Total household consumption per capita</i>	1389	812.839	1393	998.296	-185.457
Public Social Programs					
<i>Household is a beneficiary of a public assistance program (=1)</i>	1390	0.374	1393	0.279	0.095
<i>Household is a beneficiary of a government nutritional program (=1)</i>	1390	0.151	1393	0.113	0.038
<i>Transfers per capita from government programs</i>	1389	16.304	1392	12.604	3.699

Regressions of Coverage Measures on Program Dummy

Dependent Variable	Mean Control Group	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Share of rooms with cement floors</i>		0.201	0.198	0.201	0.202	0.205
		(0.011)***	(0.010)***	(0.010)***	(0.010)***	(0.010)***
		[0.021]***	[0.019]***	[0.019]***	[0.019]***	[0.019]***
	0.728	27.664	27.177	27.671	27.691	28.165
<i>Cement floor in kitchen</i>		0.255	0.251	0.255	0.255	0.259
		(0.014)***	(0.014)***	(0.014)***	(0.014)***	(0.014)***
		[0.025]***	[0.022]***	[0.022]***	[0.022]***	[0.022]***
	0.671	37.944	37.389	37.945	37.962	38.636
<i>Cement floor in dining room</i>		0.21	0.208	0.212	0.212	0.218
		(0.014)***	(0.014)***	(0.014)***	(0.014)***	(0.014)***
		[0.026]***	[0.024]***	[0.024]***	[0.024]***	[0.025]***
	0.709	29.661	29.304	29.893	29.912	30.741
<i>Cement floor in bathroom</i>		0.101	0.096	0.1	0.101	0.104
		(0.013)***	(0.013)***	(0.013)***	(0.013)***	(0.013)***
		[0.022]***	[0.020]***	[0.019]***	[0.019]***	[0.019]***
	0.803	12.586	12.012	12.497	12.524	12.919
<i>Cement floor in bedroom</i>		0.239	0.24	0.243	0.243	0.245
		(0.015)***	(0.015)***	(0.015)***	(0.015)***	(0.015)***
		[0.020]***	[0.020]***	[0.020]***	[0.020]***	[0.021]***
	0.668	35.776	35.985	36.444	36.439	36.629

Notes:
 (i) Model 1: no controls; Model 2: age and demographic controls; Model 3: age, demographic and health-habits controls; Model 4: age, demographic, health-habits and economic controls; Model 5: age, demographic, health-habits, economic and federal-programs controls.
 (ii) Reported results for Model 1 through Model 5: estimated coefficient, robust standard error in parentheses, clustered standard error at census-block level in brackets and (coefficient/control mean) * 100. * significant at 10%; ** significant at 5%; *** significant at 1%.
 (iii) Missing values in covariates were imputed with zero, and a corresponding dummy variable was then added to the regressions.

Table V: Children's Health Measures
Regressions of Health Outcomes on Program Dummy - Children Aged 0 - 5

Dependent Variable	Mean Control Group	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Parasite count (all)</i>		-0.066	-0.072	-0.073	-0.073	-0.077	-0.078
		(0.031)**	(0.030)**	(0.030)**	(0.030)**	(0.030)**	(0.030)**
		[0.050]	[0.050]	[0.049]	[0.048]	[0.049]*	[0.049]*
	0.646	-10.255	-11.095	-11.263	-11.274	-11.902	-12.029
<i>Parasite count (without BH)</i>		-0.061	-0.061	-0.061	-0.061	-0.066	-0.065
		(0.022)***	(0.022)***	(0.022)***	(0.022)***	(0.022)***	(0.022)***
		[0.032]**	[0.032]**	[0.032]**	[0.031]**	[0.032]**	[0.032]**
	0.333	-18.217	-18.213	-18.417	-18.234	-19.940	-19.680
<i>Diarrhea</i>		-0.018	-0.015	-0.018	-0.018	-0.019	-0.019
		(0.011)*	(0.011)	(0.011)*	(0.011)*	(0.011)*	(0.011)*
		[0.009]*	[0.009]*	[0.009]**	[0.009]**	[0.009]**	[0.009]**
	0.142	-12.445	-10.890	-12.428	-12.800	-13.286	-13.604
<i>Anemia</i>		-0.083	-0.081	-0.080	-0.079	-0.081	-0.080
		(0.016)***	(0.016)***	(0.016)***	(0.016)***	(0.016)***	(0.016)***
		[0.028]***	[0.027]***	[0.027]***	[0.027]***	[0.027]***	[0.027]***
	0.426	-19.446	-18.932	-18.751	-18.660	-18.967	-18.864
<i>McArthur Communication Development Test score</i>		4.037	4.724	4.978	4.951	4.622	4.613
		(1.632)**	(1.389)***	(1.412)***	(1.412)***	(1.406)***	(1.406)***
		[1.650]**	[1.527]***	[1.582]***	[1.595]***	[1.578]***	[1.584]***
	13.354	30.230	35.376	37.273	37.073	34.613	34.545
<i>Picture Peabody Vocabulary Test percentile score</i>		2.476	2.777	2.787	2.694	2.892	2.956
		(1.276)*	(1.239)**	(1.241)**	(1.239)**	(1.246)**	(1.252)**
		[1.689]	[1.448]**	[1.452]**	[1.490]*	[1.470]**	[1.477]**
	30.656	8.077	9.058	9.090	8.789	9.434	9.642
<i>Height-for-age z-score</i>		0.005	-0.008	-0.008	-0.010	-0.003	-0.001
		(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
		[0.043]	[0.039]	[0.039]	[0.039]	[0.038]	[0.038]
	-0.605	-0.784	1.285	1.289	1.588	0.500	0.161
<i>Weight-for-height z-score</i>		0.012	0.003	0.002	0.003	0.008	0.010
		(0.036)	(0.036)	(0.036)	(0.036)	(0.037)	(0.037)
		[0.034]	[0.035]	[0.035]	[0.035]	[0.036]	[0.036]
	0.125	9.900	2.383	1.586	2.218	6.035	8.245

Notes:

(i) Model 1: no controls; Model 2: age and demographic controls; Model 3: age, demographic and health-habits controls; Model 4: age, demographic, health-habits and economic controls; Model 5: age, demographic, health-habits, economic and federal-programs controls; Model 6: age, demographic, health-habits, economic, federal-programs controls, and nutritional Coahuila state-level program dummy.

(ii) Reported results for Model 1 through Model 6: estimated coefficient, robust standard error in parentheses, clustered standard error at census-block level in brackets and (coefficient/control mean) * 100. * significant at 10%; ** significant at 5%; *** significant at 1%.

(iii) Missing values in covariates were imputed with zero, and a corresponding dummy variable was then added to the regressions.

Table VI: Robustness Checks
Regressions of Health Outcomes on Program Dummy - Children Aged 0 - 5

Dependent Variable	Mean Control Group	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Respiratory diseases</i>	0.355	0.021 (0.015) [0.019]	0.020 (0.015) [0.018]	0.020 (0.015) [0.018]	0.020 (0.015) [0.018]	0.016 (0.015) [0.018]	0.017 (0.015) [0.018]
		5.812	5.594	5.533	5.562	4.485	4.753
<i>Skin diseases</i>	0.101	0.000 (0.009) [0.012]	0.001 (0.01) [0.012]	0.002 (0.01) [0.012]	0.001 (0.01) [0.011]	0.001 (0.01) [0.011]	0.000 (0.01) [0.011]
		0.080	1.099	1.743	1.337	0.646	0.274
<i>Other diseases</i>	0.041	0.005 (0.006) [0.009]	0.006 (0.006) [0.009]	0.006 (0.006) [0.009]	0.006 (0.006) [0.009]	0.006 (0.006) [0.009]	0.006 (0.006) [0.009]
		13.119	14.132	15.258	14.632	15.591	13.795
<i>Installation of cement floor</i>	0.530	0.376 (0.015)*** [0.028]***	0.373 (0.016)*** [0.028]***	0.373 (0.016)*** [0.028]***	0.373 (0.016)*** [0.028]***	0.370 (0.016)*** [0.029]***	0.370 (0.016)*** [0.029]***
		70.977	70.438	70.341	70.394	69.757	69.845
<i>Construction/expansion of sanitation facilities</i>	0.101	-0.017 (0.011) [0.015]	-0.020 (0.011)* [0.015]	-0.020 (0.011)* [0.015]	-0.020 (0.011)* [0.015]	-0.021 (0.011)* [0.015]	-0.022 (0.011)* [0.015]
		-17.021	-19.824	-19.498	-19.651	-21.153	-21.776
<i>Restoration of sanitation facilities</i>	0.045	-0.001 (0.008) [0.013]	-0.002 (0.008) [0.013]	-0.002 (0.008) [0.013]	-0.002 (0.008) [0.013]	-0.003 (0.008) [0.012]	-0.004 (0.008) [0.012]
		-3.156	-3.775	-3.667	-3.778	-7.662	-8.159
<i>Construction of ceiling</i>	0.159	0.028 (0.014)** [0.024]	0.021 (0.014) [0.024]	0.020 (0.014) [0.024]	0.020 (0.014) [0.024]	0.016 (0.014) [0.023]	0.017 (0.014) [0.023]
		17.821	13.231	12.590	12.512	10.321	10.561
<i>Restoration of walls</i>	0.111	0.012 (0.012) [0.017]	0.009 (0.012) [0.017]	0.010 (0.012) [0.016]	0.010 (0.012) [0.016]	0.009 (0.012) [0.016]	0.008 (0.012) [0.016]
		11.199	7.908	8.765	8.688	7.952	7.018
<i>Log of self-reported rental value of house</i>	5.918	0.035 (0.03) [0.040]	0.024 (0.029) [0.036]	0.032 (0.028) [0.032]	0.031 (0.028) [0.032]	0.041 (0.029) [0.032]	0.041 (0.029) [0.032]
		0.596	0.407	0.535	0.530	0.688	0.691
<i>Log of self-reported sale value of house</i>	10.491	-0.043 (0.047) [0.100]	-0.064 (0.042) [0.084]	-0.050 (0.041) [0.078]	-0.049 (0.041) [0.078]	-0.033 (0.042) [0.074]	-0.033 (0.042) [0.075]
		-0.413	-0.611	-0.481	-0.469	-0.315	-0.312
<i>Log total income of mothers of children 0 - 5 yrs</i>	7.690	-0.052 (0.056) [0.066]	-0.050 (0.056) [0.067]	-0.046 (0.055) [0.066]	-0.040 (0.052) [0.057]	-0.025 (0.053) [0.056]	-0.024 (0.053) [0.057]
		-0.673	-0.649	-0.603	-0.523	-0.331	-0.314
<i>Log total income of fathers of children 0 - 5 yrs</i>	8.123	-0.018 (0.026) [0.027]	-0.016 (0.027) [0.028]	-0.011 (0.027) [0.028]	-0.003 (0.025) [0.027]	0.002 (0.025) [0.026]	0.000 (0.025) [0.026]
		-0.218	-0.191	-0.137	-0.039	0.026	0.000

Table VII: Satisfaction and Maternal Mental Health Measures

Regressions of Satisfaction and Maternal Mental Health Measures on Program Dummy

Dependent Variable	Mean Control Group	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Satisfaction with floor quality</i>		0.221	0.215	0.216	0.215	0.217	0.219
		(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***
		[0.023]***	[0.022]***	[0.022]***	[0.022]***	[0.023]***	[0.023]***
	0.511	43.286	42.056	42.349	42.155	42.541	42.777
<i>Satisfaction with house quality</i>		0.095	0.084	0.083	0.083	0.084	0.087
		(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***
		[0.021]***	[0.020]***	[0.020]***	[0.020]***	[0.020]***	[0.020]***
	0.605	15.670	13.886	13.792	13.760	13.916	14.355
<i>Satisfaction with quality of life</i>		0.111	0.100	0.099	0.098	0.099	0.100
		(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***
		[0.022]***	[0.019]***	[0.019]***	[0.019]***	[0.019]***	[0.019]***
	0.601	18.415	16.598	16.521	16.374	16.437	16.670
<i>Depression Scale (CES-D Scale)</i>		-2.207	-2.174	-2.180	-2.156	-2.204	-2.201
		(0.338)***	(0.339)***	(0.337)***	(0.336)***	(0.338)***	(0.339)***
		[0.616]***	[0.597]***	[0.586]***	[0.577]***	[0.561]***	[0.562]***
	18.532	-11.908	-11.730	-11.763	-11.633	-11.890	-11.875
<i>Perceived Stress Scale (PSS)</i>		-1.721	-1.679	-1.680	-1.669	-1.694	-1.683
		(0.254)***	(0.255)***	(0.255)***	(0.255)***	(0.254)***	(0.256)***
		[0.428]***	[0.406]***	[0.408]***	[0.404]***	[0.393]***	[0.394]***
	16.514	-10.421	-10.165	-10.172	-10.105	-10.259	-10.190

Table VIII: Children's Health Measures

Instrumental Variables Regressions - Instrument: Program Dummy

Dependent Variable	Overall Mean	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Parasite count (all)</i>		-0.315	-0.354	-0.352	-0.354	-0.369	-0.371
		(0.146)**	(0.148)**	(0.146)**	(0.147)**	(0.146)**	(0.145)**
		[0.229]	[0.242]	[0.233]	[0.231]	[0.229]*	[0.229]*
	0.613	-0.424	-0.476	-0.474	-0.476	-0.497	-0.499
<i>Parasite count (without BH)</i>		-0.289	-0.299	-0.297	-0.295	-0.319	-0.312
		(0.106)***	(0.109)***	(0.107)***	(0.107)***	(0.107)***	(0.106)***
		[0.146]**	[0.155]**	[0.150]**	[0.149]**	[0.150]**	[0.148]**
	0.302	-0.786	-0.816	-0.809	-0.804	-0.869	-0.851
<i>Diarrhea</i>		-0.081	-0.074	-0.082	-0.085	-0.087	-0.089
		(0.049)*	(0.051)	(0.050)*	(0.050)*	(0.050)*	(0.049)*
		[0.043]*	[0.043]*	[0.043]**	[0.043]**	[0.044]**	[0.043]**
	0.133	-0.493	-0.450	-0.501	-0.517	-0.530	-0.539
<i>Anemia</i>		-0.389	-0.393	-0.379	-0.378	-0.379	-0.374
		(0.075)***	(0.077)***	(0.075)***	(0.076)***	(0.075)***	(0.075)***
		[0.123]***	[0.123]***	[0.119]***	[0.120]***	[0.118]***	[0.117]***
	0.386	-0.819	-0.827	-0.798	-0.795	-0.798	-0.787
<i>McArthur Communication Development Test score</i>		17.980	22.331	22.076	21.913	20.447	20.408
		(7.431)**	(6.877)***	(6.576)***	(6.563)***	(6.496)***	(6.497)***
		[6.924]**	[6.942]***	[6.681]***	[6.708]***	[6.759]***	[6.770]***
	15.363	0.960	1.193	1.179	1.171	1.092	1.090
<i>Picture Peabody Vocabulary Test percentile score</i>		13.766	15.309	15.139	14.660	15.480	15.670
		(7.105)*	(6.899)**	(6.820)**	(6.820)**	(6.766)**	(6.734)**
		[9.147]	[8.166]**	[8.092]**	[8.304]*	[8.082]**	[8.026]**
	31.859	0.361	0.401	0.397	0.384	0.406	0.411

**Table IX: Satisfaction and Maternal Mental Health Measures
Instrumental Variables Regressions - Instrument: Program Dummy**

Dependent Variable	Overall Mean	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Satisfaction with floor quality</i>		1.099	1.087	1.075	1.069	1.061	1.060
		(0.090)***	(0.093)***	(0.091)***	(0.090)***	(0.089)***	(0.089)***
		[0.102]***	[0.101]***	[0.098]***	[0.098]***	[0.095]***	[0.093]***
	0.622	1.464	1.448	1.432	1.425	1.414	1.412
<i>Satisfaction with house quality</i>		0.471	0.425	0.414	0.412	0.410	0.420
		(0.088)***	(0.090)***	(0.089)***	(0.089)***	(0.088)***	(0.087)***
		[0.094]***	[0.093]***	[0.093]***	[0.093]***	[0.093]***	[0.093]***
	0.653	0.598	0.539	0.526	0.524	0.520	0.533
<i>Satisfaction with quality of life</i>		0.550	0.504	0.493	0.488	0.482	0.485
		(0.086)***	(0.088)***	(0.086)***	(0.086)***	(0.085)***	(0.085)***
		[0.095]***	[0.090]***	[0.090]***	[0.087]***	[0.088]***	[0.086]***
	0.656	0.694	0.637	0.622	0.616	0.608	0.613
<i>Depression Scale (CES-D Scale)</i>		-11.000	-11.025	-10.855	-10.728	-10.778	-10.695
		(1.717)***	(1.761)***	(1.719)***	(1.714)***	(1.695)***	(1.689)***
		[3.009]***	[2.956]***	[2.901]***	[2.852]***	[2.741]***	[2.736]***
	17.431	-0.523	-0.524	-0.516	-0.510	-0.512	-0.508
<i>Perceived Stress Scale (PSS)</i>		-8.582	-8.501	-8.354	-8.293	-8.276	-8.169
		(1.321)***	(1.346)***	(1.319)***	(1.316)***	(1.294)***	(1.289)***
		[2.195]***	[2.096]***	[2.109]***	[2.091]***	[2.014]***	[2.001]***
	15.654	-0.454	-0.450	-0.442	-0.439	-0.438	-0.433

Conclusions

- Piso Frime increased housing quality
- Housing quality important for welfare
 - Child health & development
 - Happiness
 - Cost-Effective relative to other interventions
- Housing interventions maybe important poverty interventions
- Cement floors as a parasite policy
 - Ambendosal works only against worms
 - Nothing similar for protozoa