The longer-term effects of human capital enrichment programs on poverty and inequality: Oportunidades in Mexico

By Doughlas McKee and Petra E. Todd (2011)

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Introduction

- Goal
  - Study of the program's potential longer-term consequences for the poverty and inequality of children
- Literature review
  - Lopez-Acevedo (2004)
  - Freije, Bando and Arce (2006)

Data

TABLE 1
DESCRIPTIVE STATISTICS
Men and Women, age 25-40

	Men	Women
Proportion with zero earnings	0.099	0.638
Mean monthly earnings (1000's pesos)	3.945	1.140
	(0.187)	(0.127)
Median earnings	3.000	0.000
Interquartile range of earnings	3.300	3.600
Coefficient of Variation	1.123	2.276
Gini Coefficient	0.483	0.819
Theil Index	0.443	1.459
Headcount Ratio (FGT, $\alpha = 0$)*	0.227	0.763
Average Poverty Gap Ratio (FGT, $\alpha = 1$)*	0.148	0.702
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.126	0.681
Mean schooling level (last grade completed)	8.8	7.7
	(0.27)	(0.20)
Mean height (cms)	166	153
	(0.52)	(0.41)
Mean potential labor market experience	17.3	18.5
	(0.36)	(0.26)
Sample Size	1950	3221

* The three poverty measures are computed using poverty line of 1,452 pesos/mth (= 5 USD/day).

Data

TABLE 2
DESCRIPTIVE STATISTICS FOR VARIABLES USED IN TARGETING ANALYSIS
Children Age 9-12

	Children age 9-12
Participates in *Oportunidades*	0.37
	(0.05)
Mother's schooling	4.7
	(0.28)
Father's schooling	5.2
	(0.21)
Maximum of parents' schooling	6.1
	(0.22)
Household has indoor plumbing	0.46
	(0.05)
Number of children age 0-10 in household	2.1
	(0.08)
Lives in Poor Southern State‡	0.31
	(0.07)
Sample Size	1699

‡ Chiapas, Oaxaca, Guerrero, Michoacan, or Puebla.

Methodology

- DiNardo et al. (1996):

$$f_w(w|t) = \int_z f_w(w|z,t) f_z(z|t) dz$$

- Measures of poverty and inequality

TABLE 3
ESTIMATED PROBIT MODEL FOR PROBABILITY OF PARTICIPATING IN *OPORTUNIDADES*

Variable	Coefficient	p-value
Mother's schooling less than 6 grades (omitted)		
Mother's schooling 6 grades	–0.624	0.000
Mother's schooling 7 to 9 grades	–0.914	0.001
Mother's schooling 10 to 12 grades	–1.286	0.006
Mother's schooling 13 or more grades	–0.652	0.264
Father's schooling less than 6 grades (omitted)		
Father's schooling 6 grades	–0.592	0.000
Father's schooling 7 to 9 grades	–0.836	0.000
Father's schooling 10 to 12 grades	–1.284	0.015
Father's schooling 13 or more grades	0.317	0.453
Max parent's schooling less than 6 grades (omitted)		
Max parent's schooling 6 grades	0.750	0.000
Max parent's schooling 7 to 9 grades	0.916	0.000
Max parent's schooling 10 to 12 grades	1.211	0.034
Max parent's schooling 13 or more grades	–0.370	0.551
Indoor plumbing	–0.291	0.029
0 or 1 young children in household (omitted)		
2 to 4 young children in household	0.139	0.160
5 young children in household	0.466	0.037
6 or more young children in household	1.159	0.023
Living in poor southern state‡	0.257	0.201
Constant term	–0.214	0.302
Sample Size	1699	
Pseudo R-squared	0.11	

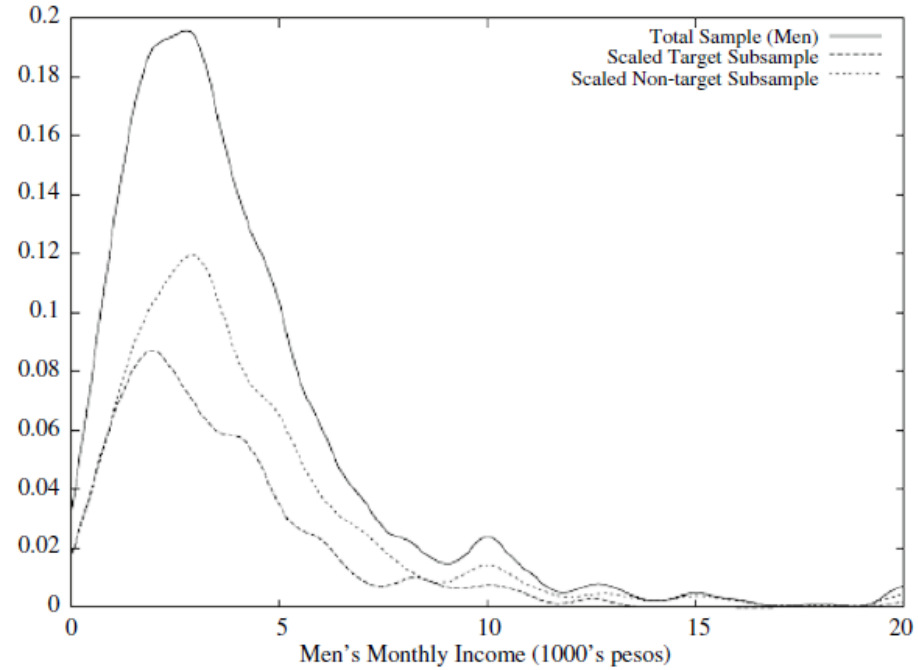
‡ Chiapas, Oaxaca, Guerrero, Michoacan, or Puebla.

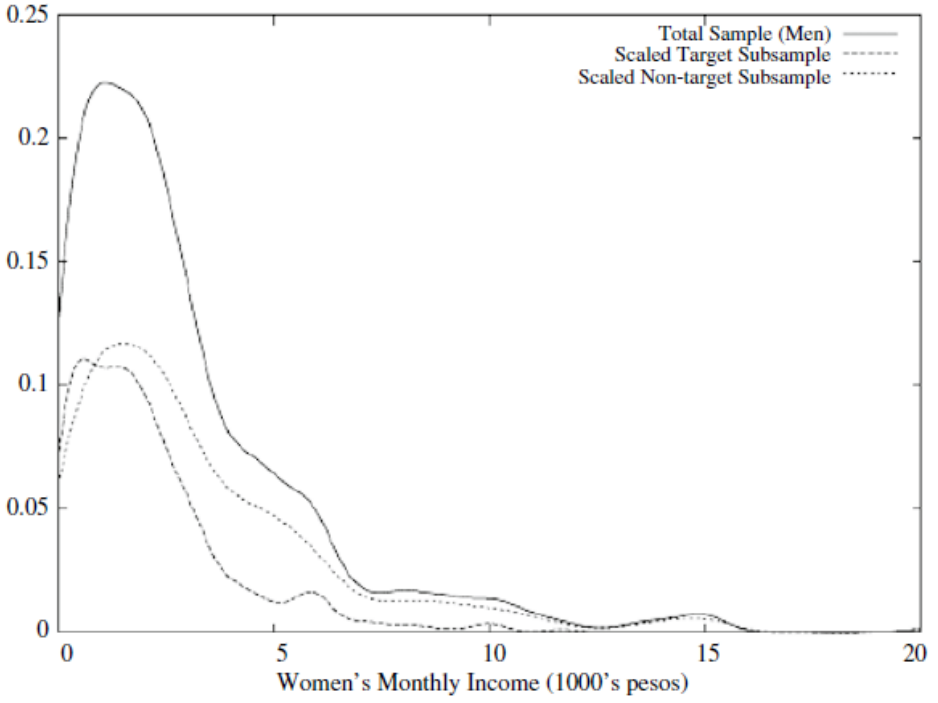
TABLE 4

DESCRIPTIVE STATISTICS FOR MEN AND WOMEN, AGE 25-40, BY PROJECTED *OPORTUNIDADES* PARTICIPATION

	Men		Women	
	40% Target	60% Non-target	40% Target	60% Non-target
Mother's schooling	1.9	4.4	1.9	4.1
	(0.14)	(0.22)	(0.12)	(0.21)
Father's schooling	2.7	5.1	2.6	4.6
	(0.17)	(0.26)	(0.13)	(0.25)
Max Parental education	3.2	5.7	3.2	5.3
	(0.19)	(0.24)	(0.14)	(0.24)
Indoor plumbing	0.18	0.85	0.18	0.80
	(0.03)	(0.03)	(0.03)	(0.03)
# children age 0-10 in household	2.5	1.1	2.5	1.2
	(0.12)	(0.07)	(0.10)	(0.06)
Living in poor southern state	0.34	0.11	0.35	0.11
	(0.06)	(0.05)	(0.06)	(0.04)
Mean monthy earnings (in 1000s of pesos)	3.3	4.3	0.7	1.5
	(0.28)	(0.25)	(0.07)	(0.20)
Schooling	7.4	9.6	6.3	8.7
	(0.25)	(0.30)	(0.20)	(0.22)
Height	164.4	166.9	152.1	154.3
	(0.56)	(0.55)	(0.50)	(0.43)
Experience	19.5	16.1	20.7	16.9
	(0.40)	(0.42)	(0.26)	(0.33)
Sample Size	867	1083	1629	1592

Densities of Income for Men and Women





Nonparametric Model (Men)

TABLE 5A
SIMULATED EFFECTS OF *OPORTUNIDADES* IMPACTS ON INCOME DISTRIBUTION
BASED ON NONPARAMETRIC EARNINGS DENSITY ESTIMATIONS
Men, Age 25-40

	Original	Schooling (+0.6 yrs)	Height (+1 cm)	Schooling (+0.6 yrs) Height (+1 cm)	Schooling (+3 yrs)	Height (+3 cm)
		(a)	(b)	(c)	(d)	(e)
Proportion with zero earnings	0.098	0.099	0.099	0.099	0.097	0.101
Mean earnings	3.931	3.944	3.961	3.974	4.255	4.037
Std. Dev. earnings	4.382	4.382	4.455	4.456	4.857	4.631
Median earnings	3.003	3.013	3.012	3.021	3.180	3.030
Interquartile Range	3.331	3.337	3.338	3.339	3.443	3.371
Coefficient of Variation	1.115	1.111	1.125	1.121	1.142	1.147
Gini Coefficient	0.485	0.485	0.487	0.487	0.491	0.493
Theil Index	0.446	0.445	0.451	0.450	0.458	0.462
Headcount Ratio (FGT, $\alpha = 0$)*	0.237	0.236	0.235	0.235	0.219	0.233
Average Poverty Gap Ratio (FGT, $\alpha = 1$) *	0.158	0.158	0.158	0.157	0.149	0.158
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.126	0.126	0.126	0.126	0.121	0.127

Sample size is 1950.

Nonparametric Model (Women)

TABLE 5B
SIMULATED EFFECTS OF *OPORTUNIDADES* IMPACTS ON INCOME DISTRIBUTION
BASED ON NONPARAMETRIC EARNINGS DENSITY ESTIMATIONS
Women, Age 25-40

	Original	Schooling (+0.6 yrs)	Height (+1 cm)	Schooling (+0.6 yrs) Height (+1 cm)	Schooling (+3 yrs)	Height (+3 cm)
		(a)	(b)	(c)	(d)	(e)
Proportion with zero earnings	0.637	0.632	0.639	0.633	0.589	0.640
Mean earnings	1.147	1.173	1.149	1.177	1.448	1.155
Std. Dev. earnings	2.618	2.644	2.618	2.650	2.954	2.626
Median earnings	0.000	0.000	0.000	0.000	0.000	0.000
Interquartile Range	1.335	1.394	1.337	1.399	1.909	1.335
Coefficient of Variation	2.283	2.254	2.228	2.251	2.040	2.274
Gini Coefficient	0.819	0.816	0.819	0.816	0.791	0.819
Theil Index	1.478	1.460	1.479	1.460	1.325	1.480
Headcount Ratio (FGT, $\alpha = 0$)*	0.759	0.755	0.759	0.754	0.713	0.759
Average Poverty Gap Ratio (FGT, $\alpha = 1$) *	0.706	0.701	0.707	0.702	0.658	0.708
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.675	0.670	0.676	0.671	0.627	0.678

Sample size is 3221.

Probit Model for Employment

TABLE 6A
ESTIMATED PARAMETRIC PROBIT MODELS FOR EMPLOYMENT

Variables	Men	Women
Schooling (years)	0.009	0.107
	(0.022)	(0.013)
Height	0.141	0.070
	(0.212)	(0.145)
Height^2	–0.000	–0.000
	(0.001)	(0.0005)
Experience	0.067	0.000
	(0.038)	(0.029)
Experience^2	–0.002	0.000
	(0.001)	(0.0007)
Constant	–9.914	–6.030
	(17.628)	(11.178)
Sample Size	1950	3221
Pseudo R-squared	0.0145	0.0513

Standard errors are in parentheses.

Parametric Regression for Income

TABLE 6B
ESTIMATED PARAMETRIC REGRESSION MODELS FOR LOG INCOME

Variables	Men	Women
Schooling (years)	0.087	0.154
	(0.011)	(0.015)
Height	–0.073	0.090
	(0.085)	(0.139)
Height^2	0.000	–0.000
	(0.0002)	(0.0004)
Experience	0.040	–0.002
	(0.019)	(0.037)
Experience^2	–0.001	0.001
	(0.001)	(0.001)
Constant	4.298	–9.251
	(7.300)	(10.768)
Sample Size	1720	1044
R-squared	0.1966	0.2712

Standard errors are in parentheses.

Parametric Model (Women)

TABLE 7A

SIMULATED EFFECTS OF *OPORTUNIDADES* IMPACTS ON INCOME DISTRIBUTION BASED ON PARAMETRIC EARNINGS MODELS

Men, Age 25-40

	Original	Schooling (+0.6 yrs)	Height (+1 cm)	Schooling (+0.6 yrs) Height (+1 cm)	Schooling (+3 yrs)	Height (+3 cm)
		(a)	(b)	(c)	(d)	(e)
Proportion with zero earnings	0.099	0.098	0.099	0.100	0.096	0.102
Mean earnings	3.945	4.006	3.968	4.023	4.247	4.015
Std. Dev. earnings	4.432	4.472	4.451	4.497	4.691	4.497
Median earnings	3.000	3.000	3.000	3.000	3.200	3.000
Interquartile Range	3.300	3.417	3.364	3.406	3.454	3.440
Coefficient of Variation	1.123	1.116	1.122	1.117	1.104	1.120
Gini Coefficient	0.483	0.481	0.483	0.482	0.479	0.483
Theil Index	0.443	0.439	0.443	0.441	0.433	0.444
Headcount Ratio (FGT, $\alpha = 0$)*	0.227	0.220	0.225	0.222	0.206	0.222
Average Poverty Gap Ratio (FGT, $\alpha = 1$) *	0.148	0.145	0.148	0.147	0.139	0.149
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.126	0.124	0.126	0.126	0.121	0.128

Sample size is 1950.

Parametric Model (Women)

TABLE 7B
SIMULATED EFFECTS OF *OPORTUNIDADES* IMPACTS ON INCOME DISTRIBUTION BASED ON PARAMETRIC EARNINGS MODEL
Women, Age 25-40

	Original	Schooling (+0.6 yrs)	Height (+1 cm)	Schooling (+0.6 yrs) Height (+1 cm)	Schooling (+3 yrs)	Height (+3 cm)
		(a)	(b)	(c)	(d)	(e)
Proportion with zero earnings	0.638	0.627	0.640	0.629	0.596	0.644
Mean earnings	1.140	1.196	1.132	1.199	1.438	1.133
Std. Dev. earnings	2.595	2.662	2.569	2.673	3.108	2.583
Median earnings	0.000	0.000	0.000	0.000	0.000	0.000
Interquartile Range	1.200	1.400	1.228	1.400	2.000	1.265
Coefficient of Variation	2.276	2.225	2.269	2.230	2.160	2.279
Gini Coefficient	0.819	0.813	0.819	0.813	0.796	0.821
Theil Index	1.459	1.423	1.458	1.428	1.344	1.467
Headcount Ratio (FGT, $\alpha = 0$)*	0.763	0.753	0.764	0.754	0.715	0.764
Average Poverty Gap Ratio (FGT, $\alpha = 1$) *	0.702	0.691	0.703	0.692	0.656	0.706
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.681	0.670	0.682	0.671	0.636	0.686

Sample size is 3221.

Target bottom of educational distribution (Men)

TABLE 8A
SIMULATED EFFECTS OF *OPORTUNIDADES* IMPACTS ON INCOME DISTRIBUTION
BASED ON NONPARAMETRIC EARNINGS DENSITY ESTIMATIONS
PERFECT TARGETING
Men, Age 25-40

	Original	Schooling (+0.6 yrs)	Height (+1 cm)	Schooling (+0.6 yrs) Height (+1 cm)	Schooling (+3 yrs)	Height (+3 cm)
		(a)	(b)	(c)	(d)	(e)
Proportion with zero earnings	0.098	0.097	0.098	0.097	0.090	0.101
Mean earnings	3.931	3.945	3.950	3.960	4.084	3.958
Std. Dev. earnings	4.382	4.381	4.409	4.402	4.405	4.451
Median earnings	3.003	3.015	3.018	3.030	3.214	3.031
Interquartile Range	3.331	3.344	3.324	3.333	3.289	3.308
Coefficient of Variation	1.115	1.111	1.116	1.111	1.079	1.124
Gini Coefficient	0.485	0.485	0.485	0.484	0.467	0.486
Theil Index	0.446	0.444	0.446	0.443	0.417	0.451
Headcount Ratio (FGT, $\alpha = 0$)*	0.237	0.236	0.234	0.233	0.211	0.234
Average Poverty Gap Ratio (FGT, $\alpha = 1$) *	0.158	0.157	0.157	0.156	0.141	0.159
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.126	0.125	0.126	0.124	0.113	0.128

Sample size is 1950.

Target bottom of educational distribution (Women)

TABLE 8B
SIMULATED EFFECTS OF *OPORTUNIDADES* IMPACTS ON INCOME DISTRIBUTION
BASED ON NONPARAMETRIC EARNINGS DENSITY ESTIMATIONS
PERFECT TARGETING
Women, Age 25-40

	Original	Schooling (+0.6 yrs)	Height (+1 cm)	Schooling (+0.6 yrs) Height (+1 cm)	Schooling (+3 yrs)	Height (+3 cm)
		(a)	(b)	(c)	(d)	(e)
Proportion with zero earnings	0.637	0.635	0.637	0.635	0.606	0.640
Mean earnings	1.147	1.157	1.149	1.161	1.287	1.152
Std. Dev. earnings	2.618	2.624	2.623	2.630	2.740	2.638
Median earnings	0.000	0.000	0.000	0.000	0.000	0.000
Interquartile Range	1.335	1.366	1.336	1.372	1.713	1.332
Coefficient of Variation	2.283	2.267	2.283	2.264	2.129	2.290
Gini Coefficient	0.819	0.817	0.819	0.817	0.797	0.820
Theil Index	1.478	1.468	1.479	1.467	1.367	1.484
Headcount Ratio (FGT, $\alpha = 0$)*	0.759	0.757	0.759	0.756	0.728	0.759
Average Poverty Gap Ratio (FGT, $\alpha = 1$) *	0.706	0.704	0.706	0.704	0.673	0.708
Foster-Greer-Thorbecke Index (FGT, $\alpha = 2$)*	0.675	0.673	0.676	0.673	0.643	0.678

Sample size is 3221.