Human Capital Accumulation and Disasters:

Evidence from the Pakistan Earthquake of 2005

Tahir Andrabi, Benjamin Daniels, and Jishnu Das

Online Appendix

A1. Description of Sample, Survey Implementation and Human Capital Measures

Our sampling strategy is fully reported in Andrabi and Das (2016):

> *The epicenter of the earthquake was near the city of Muzaffarabad, on the Pakistani side of the Kashmir region approximately 60 miles northeast of Islamabad, the capital. The data in this study come from the four worst affected districts: Bagh and Muzaffarabad (later split into two districts, Neelum and Muzaffarabad) in Kashmir Province, and Mansehra and Abbotabad in the North- Western Frontier Province (renamed Khyber Pakhtunkhwa in 2011). These districts are in two provinces—the North-West Frontier Province (NWFP), now called Khyber Pakhtunwa or KP and Azad Jammu & Kashmir or AJK. The latter is along the "Line of Control" with India. While there was a census of villages in NWFP in 1998 and a similar village listing in AJK, the latter was never publicly released given the disputed international status of AJK. Working together with administrations in both provinces, we managed over a year to compile a clean full list of 1656 "villages" that were theoretically in the census lists. Note though that in the case of NWFP there were 12 years since the last census update and in AJK the original lists had not been physically verified. From this list of 1656 villages in the 4 districts, we took an equal probability sample of 150 villages. We chose an equal probability rather than a PPS sample because the first stage of our work involved a full census of households. At the time we chose our sample, we did not know the physical locations of these villages– particularly in AJK–where geographical information was very sparse and even the local administration was not sure of village locations due to the mountainous terrain.*
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> *We first completed a census of all households in the sampled villages. The census allowed us to estimate mortality (a low probability event), and receipt of aid (short-form) and home destruction long-form census, supplemented with the household survey to augment the sample). The randomization for which household received long and short-form censuses was done in the field as multiple census visits were not practical. Appendix Table A1 shows the comparison of key variables between the short and long-form census and validates the randomization. We present standard t-tests of the differences in means. Because the sample sizes are large, some very small differences are also statistically significant. We therefore also present the normed mean differences as in Imbens and Woolridge (2008) to document the size of the difference with reference to the underlying standard deviation, where we can verify that none of the differences exceed the 0.2sd threshold suggested by Imbens and Woolridge (2008).*
>
> *Exclusions from the Sample and Non-Completion: In our initial scoping visits, out of the 150 villages that we had chosen, 3 "villages" turned out to be mid-size towns and were no longer classified as rural by the administration and another 4 villages could not be found in the administrative region. Further consultation with the administration revealed that these villages may have existed 30-40 years ago but had long been abandoned. Another 10 were directly on the Line of Control and the army did not allow our teams*

access. Therefore, we excluded these villages entirely from our sample and chose to define our study over the villages that were not on the Line of Control. We chose not to "refill" the sample because our scoping visit also suggested sufficient household sample for estimates of destruction using the smaller number of villages. Given the security concerns in the area, it was hard to send our teams repeatedly to complete additional scoping for a refill sample. This left us with 133 villages in our sample. Thus, our sample excludes villages along the Line of Control.

From these 133 villages, 7 villages were in a union council that had recently experienced serious security issues and this had to be excluded due to safety considerations. The 7 villages that could not be surveyed due to security issues could bias our results if they were particularly close to the fault-line but had low trust in foreigners–this is something we cannot verify in the data. Finally, 62 respondent individuals from 33 households are discarded in analysis due to invalid GPS coordinates.

As part of the detailed household survey, which covered a randomly selected 10% subsample of our village census households, we administered in-home academic tests covering English, mathematics, and Urdu (the vernacular language) to all children aged 3-15 at the time of the data collection exercise, meaning they were in utero or aged up to 11 at the time the earthquake struck. Each section was scored across all children using item response theory (IRT), and the overall score for each child is the mean of the three tests. Appendix Figure A1 gives some examples of the questions posed in this test, along with the response rates by age of the child. Table A1a reports testing completion among the eligible group recorded in the household roster listings along with reasons for non-completion, and Table A1c demonstrates that the tested group is a representative subsample of the eligible group.

Children aged 3 and up were eligible for height and weight measurements. We report measurement completion for children aged 3-15 (those in utero or aged up to 11 at the time of the earthquake) in table A1b, along with average measurement statistics. To remove skewness and adjust for the variations in anthropometric measures that depend on age, all heights and weights are standardized to Z-scores using the 2000 US CDC Growth Reference, trimmed at +/-4 standard deviations.[1] Table A1d confirms that the measured group is a representative sub-sample of the eligible group.

Of the 2,297 children aged 7-15 during the survey and therefore eligible for testing, we successfully tested 2,452 and matched 2,386 of those to maternal data. 1,875 school-age children were included in main regressions. Of the 4,474 children aged 3-15 during the survey and therefore eligible for measurement, we successfully measured 4,097 and matched 4,002 to maternal data (although one had an invalid height measurement only). Children with missing data in both cases were primarily not present in the household at the time of the survey; more detailed reasons were not collected.

[1] Code description available at: Vidmar, Suzanna, John Carlin, Kylie Hesketh, and Tim Cole. "Standardizing anthropometric measures in children and adolescents with new functions for egen." The Stata Journal 4, no. 1 (2004): 50-55.

A2. Threats to Exogeneity: Aid Spillovers, Migration, and Mortality

Although the earthquake shock itself was exogenous to pre-earthquake characteristics, several further conditions must be satisfied for our survey measures, taken four years later, to be considered causal results from the "joint treatment" of earthquake and subsequent aid. First, aid delivery must be relatively constrained to the earthquake-affected area: otherwise, nearby areas unaffected by the earthquake but receiving aid money would not be an appropriate counterfactual to the exposed region. We demonstrate nonparametrically in Figure 5 that aid receipts drop off dramatically beginning around 20km from the activated Faultline, and we confirm in Table A2b that the relationship between aid delivery and fault distance is strong. Additionally, we observe that key socioeconomic characteristics such as household education and pre-earthquake wealth are uncorrelated with the amount of cash aid received as a result.

Next, we address the questions of selective migration and mortality. In our survey we specifically enumerated members of the household who lived there before the earthquake but not currently and vice-versa. Using this information, we regress the likelihood that a household member died or is a migrant on distance to the fault line in Table A2a. We find no difference among adults or among child out-migration; however, we find a significantly higher likelihood that a child is a new arrival further from the earthquake. It is a relatively small effect (2.4 percentage points in our comparison of 10km to 40km), and given that the overall rate of migration is around 3% for all groups we believe large migration flows are not a critical threat to the comparability of our measures. Similarly, as we demonstrated relatively low mortality even in the most exposed areas of the earthquake, we do not believe sample selection in general drives our results.

Nevertheless, we compute bounds for unfavorable selection assumptions for all possible forms of migration, mortality, and survey non-responsiveness in Table A2d. To assess the extent to which selective missingness could compromise our results, we now utilize our complete roster of all potentially eligible non-responders to compute bounds on our primary effects using the method detailed in Lee (2009). Using our binary indicator of distance, this bounding method estimates 2.1% excess responsiveness with 442 non-responsive children of 2,317 potential respondents, and the lower bound on the shock effect between near and far school-age children of -0.13 SD with p=0.014, compared to an unadjusted estimate of -0.17 SD. For heights among children in utero or age 0-2, missingness appears more selective; 4.5% excess observations are trimmed and the worst-case assumptions lead to a point estimate of -0.33 SD with p=0.134, compared to an unadjusted estimate of -0.70 SD.

Finally, we conduct a placebo test for the size of these effects in our sample population under strong null hypotheses. To investigate whether selective location decisions regarding fault line proximity could produce the adverse developmental results that we estimate due to the earthquake, we conducted a placebo test by simulating the test scores and education earthquake outcomes with respect to each fault line in our data. We run all 50 possible regressions in the true data under the null of "no earthquake" and evaluate the distribution of coefficients we obtain. Appendix Figure A2 illustrates the joint distribution of these coefficients, with the coefficients obtained in our regressions on the activated fault plotted for reference. While there is a wide distribution of test score coefficients, they mostly occur with respect to much smaller fault lines; and large positive height coefficients appear *in combination* with large positive test score coefficients in only one (smaller) fault other than the activated Balakot-Bagh fault. The observed combination of coefficients is at the 98th percentile of the joint distribution. Appendix Figure A3, for reference, compares the magnitude of our height effect on a range of effects from the literature.

A3. Maternal Education instrument and channels

Table A3a illustrates the first stage of our IV regression and uses alternative specifications and placebo tests to check for robustness. The first column reports the specification directly, showing that the availability of a girls' school in the mother's birth village increased her likelihood of completing primary school by 12.5 percentage points. Restricting that sample to those mothers who ever received a school or including geographical controls, as we do in Column 2 and 3, does not affect this result. Using the presence of a boys' school as a placebo, we find a null effect for an identical regression (Column 4); similarly, including indicators for the availability of girls' schools at slightly later ages shows no effect on the likelihood of maternal education (Column 5). Column 6 shows the (much weaker) first stage for the specification including maternal birth village fixed effects.

Figure A4 visualizes the results of our mitigation OLS regression for reference. Figure A4 illustrates the results of a robustness check in which we systematically exclude each cluster (village) from the mitigation IV regression on test scores; even the most extreme result remains statistically significant at conventional levels. There, we re-run the maternal-education interaction IV regression, systematically excluding each one of our 124 clusters (villages) from the full IV regression. Our results are robust to this procedure, plotting the distribution of the 124 mitigation coefficients obtained this way. The iteration closest to the null result, which drops a village containing 8 mothers of 12 children, gives a coefficient of -0.099 with a p-value of 0.005. Excluding the two clusters closest to the null (two villages with 19 mothers of 33 children) gives a coefficient of -0.083 with a p-value of 0.010.

Table A3b examines differences between children of educated mothers and children whose mothers did not complete primary school. In many characteristics, OLS differences are significant: the children are more likely to have completed primary school, have a similarly educated father; be enrolled in school and in private school; and they are richer and closer to public infrastructure. Only the father's education remains significant in an IV specification; however, as in our other IV results, the precision of all the estimates is low.

Table A3c presents reduced-form and IV estimates of the effect of maternal access to education and of actual schooling, including a full set of dummy controls for the maternal village of birth. We present results with and without clustering for the current village. Table A3d restricts the maternal mitigation regressions to the sample of children for which there is only one school available in the village, to investigate school-switching as a channel for educated mothers to have an effect; in this sample (where no other school could be chosen), the estimated effect of maternal education is even larger than in the full sample. However, the small sample size substantially increases the variance of the IV estimator and this result is no longer significant.

Table A3e investigates alternative potential mitigating characteristics for both height and test scores. Columns 1 through 3 show non-significant and non-causal mitigation results for the test scores results for all three potential mitigating factors. Columns 4 though 6 show significant but non-causal mitigation for maternal mental health and household elevation, and a reversed coefficient for the assets specification. For all these potential interactions, we lack sufficient evidence to make any claims about the (non)existence or causality of the effects, and we believe they are all of interest for future investigation.

A4. Robustness to alternate regression specifications

Table A4a reproduces all results from Table 3. Appendix Table A4a includes the total aid received as an additional variable in the height and test score regressions. The aid coefficient is imprecisely estimated and small in magnitude. We caution that these estimates are difficult to interpret, as 27% of the variation in aid is accounted for by geographical controls (after accounting for eligibility due to death and disability) and the remaining variation reflects a combination of household-specific shocks that may be directly correlated with human capital formation (such as death or disability or delayed housing construction), measurement error and genuine errors in allocation.

Table A4b reproduces Column 2 and Column 5 from Table 3 with a variety of alternative specifications removing the control variables we include in our main regressions. Appendix Table A4b therefore investigates the sensitivity of our results to the choice of controls. We include five variants here, with Column 1 presenting the main specification for reference. Column 2 presents the results without gender controls and Column 3 removes age controls; no result is sensitive to these. Column 4 further removes geographical controls and Column 5 removes the district fixed effects: in these versions, the height result is unchanged but the test-score result becomes smaller and loses significance. It is important to note that the argument for the exogeneity of the fault line variable is conditional on the geographical controls so removing them from the regression leads to coefficients not obviously interpretable.

Table A4c replaces the measure of exposure to the earthquake with the local Mercalli intensity of the earthquake for all households rather than using the linear distance to the fault line. Using this measure makes the height effect estimates noisier and less significant (note the signs reverse in this specification: higher intensity occurs at lower distances), and the test score effects are similar. Extrapolating over the range of the sample gives quantitatively similar estimates of average effects sizes.

Table A4d reproduces Table 3 and includes additional controls for nine fertility selection variables (summarized in Appendix Figure A8). The results are primarily unchanged. Table A4e includes a control for local population density proxied by the number of children per school at the village level. There is a strong correlation between this measure and the test results outcomes; there is also a correlation between this measure and the distance to the fault line. The main distance-to-fault results are therefore much noisier and less precise in all specifications where this control is included, although the point estimates are not substantially different.

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Table A1a. Test completion for eligible children, by age at time of survey

	Eilgible for Testing	Tested and Matched to Maternal Data	Tested but Missing Mother	Temporarily Away	No Longer in Household	Disabled	Working	No Reason Given
Age 7	258	212	7	16	2	2	0	19
Age 8	369	300	9	33	2	4	0	21
Age 9	315	261	3	24	6	3	1	17
Age 10	434	357	12	36	9	5	0	15
Age 11	223	195	4	11	1	0	0	12
Age 12	438	357	13	36	8	5	3	16
Age 13	281	232	6	27	4	2	1	9
Age 14	351	276	9	34	7	2	1	22
Age 15	258	196	3	28	4	1	3	23
Total	2,927	2,386	66	245	43	24	9	154

Notes: Ages at time of earthquake are four years younger.

Table A1b. Measurement completion for eligible children, by age at time of survey

	Eligible for Measurement	Measured and Matched to Maternal Data	Measured but Missing Mother	Mean Height (cm)	Mean Height-for-Age (Z-score)	Mean Weight (kg)	Mean Weight-for-Age (Z-score)
Age 3	404	380	2	87.28	-2.24	15.62	0.57
Age 4	440	403	10	95.84	-1.47	16.86	0.04
Age 5	278	253	5	103.14	-1.20	17.62	-0.62
Age 6	425	388	10	107.39	-1.63	21.16	-0.11
Age 7	258	239	7	111.24	-2.07	22.32	-0.54
Age 8	369	325	9	115.98	-2.19	23.69	-0.89
Age 9	315	283	3	118.41	-2.57	24.92	-1.26
Age 10	434	378	12	118.57	-3.17	26.61	-1.53
Age 11	223	208	4	128.67	-2.18	30.55	-1.27
Age 12	438	381	13	130.45	-2.68	32.13	-1.63
Age 13	281	247	6	130.72	-3.51	34.59	-1.87
Age 14	351	301	9	151.63	-1.41	37.50	-1.97
Age 15	258	216	5	153.75	-1.61	39.34	-2.40
Total	4,474	4,002	95	117.46	-2.16	25.63	-0.95

Notes: Ages at time of earthquake are four years younger.

Table A1c. Comparison of tested children to eligible children

	Full Sample	Tested	T-Test Difference
Male	0.52	0.51	-0.00
	0.01	*0.01*	*0.01*
Age	10.95	10.92	-0.04
	0.05	*0.05*	*0.07*
Height (cm)	128.12	128.23	0.11
	0.35	*0.36*	*0.50*
Weight (kg)	29.88	29.89	0.01
	0.17	*0.17*	*0.24*
Household Asset Index	0.01	0.05	0.04
	0.02	*0.02*	*0.03*
Completed Primary School	0.33	0.34	0.01
	0.01	*0.01*	*0.01*
Father Completed Primary School	0.54	0.56	0.02
	0.01	*0.01*	*0.01*
Mother Completed Primary School	0.18	0.18	0.01
	0.01	*0.01*	*0.01*
Mother's Age	39.48	39.45	-0.03
	0.15	*0.16*	*0.22*
Enrolled (Earthquake)	0.87	0.90	0.03***
	0.01	*0.01*	*0.01*
Enrolled (Survey)	0.90	0.94	0.04***
	0.01	*0.01*	*0.01*
Private School (Earthquake)	0.19	0.20	0.00
	0.01	*0.01*	*0.01*
Private School (Survey)	0.22	0.22	0.00
	0.01	*0.01*	*0.01*
Number of Observations	2,844	2,386	.

Notes: Differences are controlled for distance to the earthquake epicenter, local slope, district fixed effects, gender, and individual age indicators.

Table A1d. Comparison of measured children to eligible children

	Full Sample Mean	Measured Mean	T-Test Difference
Male	0.51	0.51	-0.01
	0.01	*0.01*	*0.01*
Age	8.70	8.61	-0.09
	0.06	*0.06*	*0.08*
Household Asset Index	0.01	0.02	0.01
	0.01	*0.02*	*0.02*
Completed Primary School	0.21	0.21	-0.00
	0.01	*0.01*	*0.01*
Father Completed Primary School	0.57	0.58	0.00
	0.01	*0.01*	*0.01*
Mother Completed Primary School	0.22	0.23	0.00
	0.01	*0.01*	*0.01*
Mother's Age	37.42	37.32	-0.10
	0.13	*0.13*	*0.18*
Enrolled (Earthquake)	0.87	0.88	0.01
	0.01	*0.01*	*0.01*
Enrolled (Survey)	0.90	0.91	0.01
	0.01	*0.01*	*0.01*
Private School (Earthquake)	0.19	0.20	0.00
	0.01	*0.01*	*0.01*
Private School (Survey)	0.22	0.21	-0.00
	0.01	*0.01*	*0.01*
Number of Observations	4,359	4,002	.

Notes: Differences are controlled for distance to the earthquake epicenter, local slope, district fixed effects, gender, and individual age indicators.

Table A2a. Death and migration after the earthquake regression results

	(1) Earthquake Mortality	(2) Later Mortality	(3) Adult Out Migration	(4) Adult In Migration	(5) Child Out Migration	(6) Child In Migration
Distance from Faultline (km)	-0.001**	0.000	-0.000	0.000	0.000	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.001	0.006***	-0.011**	-0.038***	-0.001	-0.008
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.005)
Asset Index (PCA) (Pre-Quake)	-0.000	-0.001	0.004	0.002	-0.002	-0.003
	(0.002)	(0.001)	(0.003)	(0.002)	(0.002)	(0.003)
Distance * Assets	-0.000	-0.000				
	(0.000)	(0.000)				
Age	-0.001***	-0.001***				
	(0.000)	(0.000)				
Age Squared	0.000***	0.000***				
	(0.000)	(0.000)				
Distance to Epicenter (km)	0.000	0.000	-0.001**	-0.001**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Slope of UC	0.000	-0.000**	0.001	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)
District - Abbottabad	-0.012*	0.007**	0.021*	-0.007	-0.008	-0.016
	(0.007)	(0.003)	(0.011)	(0.008)	(0.006)	(0.013)
District - Bagh	-0.016	0.004	0.021*	0.016	0.007	0.000
	(0.016)	(0.006)	(0.012)	(0.010)	(0.006)	(0.011)
District - Mansehra	-0.014	-0.003	0.034**	-0.005	0.000	0.009
	(0.009)	(0.003)	(0.014)	(0.006)	(0.004)	(0.010)
Constant	0.038***	0.013**	-0.026	0.061***	0.012	-0.017
	(0.010)	(0.006)	(0.026)	(0.017)	(0.016)	(0.018)
Numbar of Observations	14,529	14,314	8,152	8,152	4,474	4,474
Age Dummies			X	X	X	X
Regression R2	0.015	0.034	0.033	0.048	0.009	0.207
Dependent Variable Mean	0.015	0.010	0.035	0.028	0.010	0.030

Notes: Regressions are controlled for distance to the earthquake epicenter, local slope, district fixed effects, and distance to the nearest fault line. Migration regressions in columns 3-6 include all available ages as dummy variables.

Table A2b. Aid to households regression results

	(1) Any Aid	(2) Cash Aid	(3) Medical Aid	(4) Shelter Aid	(5) Food Aid	(6) Supplies Aid	(7) Organizational Aid	(8) Cash Aid Total (PKR)
Distance to Fault (km)	-0.01***	-0.01***	-0.00**	-0.01***	-0.00***	-0.01***	-0.00	-1,480.51***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(235.89)
Female Head of HH	0.03*	0.04	0.04	-0.00	0.01	0.02	-0.00	-1,582.26
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(6,166.07)
Female 19-35 Completed Primary School	-0.00	-0.02**	0.01	0.00	-0.00	0.01	-0.00	606.08
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(1,804.82)
Male 19-35 Completed Primary School	-0.01	-0.01	-0.01	-0.03*	-0.05**	-0.00	0.01	-2,442.55
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(3,833.33)
Family Size	0.01**	0.00	-0.00	0.01**	0.00	0.01***	-0.00	11,475.37***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(1,182.18)
Asset Index (PCA) (Pre-Quake)	0.00	-0.02	0.02**	0.00	0.02*	0.02	-0.00	1,705.65
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(2,093.00)
House Destroyed in Quake?	0.13***	0.06*	0.10***	0.14***	0.13***	0.07**	0.03**	41,346.94***
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.01)	(5,475.37)
Eligible for death compensation?	-0.01	0.05	-0.01	-0.04	0.00	-0.03	0.01	51,119.47***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(10,830.81)
Eligible for housing compensation?	0.09***	0.08***	0.04**	0.05**	0.05**	0.02	-0.02	17,532.09***
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(5,465.65)
Eligible for injury compensation?	0.01	0.01	0.02	0.06*	-0.01	0.00	-0.01	-21,839.38**
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(8,407.99)
Eligible for lcgs compensation?	-0.03*	-0.01	-0.05***	-0.05***	-0.04***	-0.00	-0.03**	-7,502.60***
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(2,491.77)
N children under 6 at EQ	0.01**	0.01	0.01*	-0.00	0.01	0.00	-0.00	13,001.88***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(1,589.55)
Number of observations	2,455	2,455	2,455	2,455	2,455	2,455	2,455	2,455
Regression R2	0.600	0.307	0.146	0.259	0.333	0.223	0.066	0.484
Dependent Variable Mean	0.67	0.47	0.18	0.36	0.44	0.33	0.08	8,128.99

Notes: Regressions are controlled for distance to the earthquake epicenter, local slope, district fixed effects, and distance to the nearest fault line.

Table A2c. Distance-to-faultline regression results by subject

	(1) Averaged	(2) English	(3) Math	(4) Urdu
Distance from Faultline (km)	0.009**	0.009**	0.007*	0.010**
	(0.004)	*(0.004)*	*(0.003)*	*(0.004)*
Distance to Epicenter (km)	-0.007**	-0.009**	-0.004	-0.008**
	(0.003)	*(0.004)*	*(0.003)*	*(0.004)*
Mean Slope of UC	-0.012*	-0.014*	-0.014**	-0.009
	(0.007)	*(0.007)*	*(0.007)*	*(0.008)*
Male	0.067	0.015	0.098**	0.089*
	(0.044)	*(0.050)*	*(0.047)*	*(0.050)*
Constant	0.194	0.370	0.103	0.109
	(0.211)	*(0.225)*	*(0.215)*	*(0.245)*
Dependent Variable Mean	*0.009*	*-0.011*	*0.028*	*0.009*
Regression R2	0.089	0.062	0.073	0.077
Number of observations	1,875	1,875	1,875	1,875

Notes: Regressions are controlled for distance to the earthquake epicenter, local slope, district fixed effects, and distance to the nearest fault line.

Table A2d. Selection bounds for earthquake effect

	(1)	(2)	(3)	(4)
	Test Scores Bounds		Height Bounds (In Utero and Ages 0-2)	
	Lower	Upper	Lower	Upper
Near fault (<20km)	-0.220	-0.130	-1.031	-0.329
Standard error	0.060	0.053	0.219	0.219
Z-score	-3.672	-2.447	-4.714	-1.499
P-value	0.000	0.014	0.000	0.134
Lower bound	-0.338	-0.235	-1.460	-0.758
Upper bound	-0.103	-0.026	-0.602	0.101
N observed	1,874		1,423	
N not observed	442		133	
Trimming proportion	2.06%		4.53%	

Note: Results show the upper and lower bounds obtained by following the Lee (2009) procedure for trimming excess observations with adverse assumptions due to selective unavailability in either treatment or control groups.

Table A3a. IV Instrument falsification tests for mothers and first stage F-tests

(Dependent variable: Probability of woman having completed primary school)

	(1) Instrument	(2) Recieved School Sometime	(3) Geographical Controls	(4) Boys' School	(5) Girls' School (Other Ages)	(6) Birth Village FE
Distance from Faultline (km)	0.001	0.000	0.001	0.000	0.000	0.004
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)
Girls' school present by age 9	0.125***	0.123***	0.116***		0.136***	0.085
	(0.029)	(0.032)	(0.029)		(0.041)	(0.060)
Boys' school present by age 8				-0.012		
				(0.030)		
Girls' school present at age 10-14					0.033	
					(0.050)	
Girls' school present after age 14					0.013	
					(0.033)	
Constant	0.395	-0.402***	0.535	-0.651	-0.599	-1.022**
	(0.345)	(0.119)	(0.545)	(0.620)	(0.590)	(0.476)
Number of observations	987	835	987	987	987	986
F-statistic for Age 9 School Availability	18.310	15.200	16.120	0.160	10.960	1.990

Note: This table reports the first-stage regression results from our IV specification in Column 1. Column 2 restricts the sample to mothers who eventually received a school in their lifetime; Column 4 includes geographical controls for distance to the earthquake epicenter, local slope, and district fixed effects; Column 4 reports placebo results using the availability of a boys' school at the same age in place of the girls' school; and Column 5 reports placebo results using the availability of girls' schools at ages after the typical enrollment age. Column 6 includes maternal birth village fixed effects as a control.

Table A3b. Child characteristics by maternal primary education status

	(1)	(2)	(3)	(4)	(5)
	Means		Difference		
	No Maternal Primary Education	Maternal Primary Education	OLS	IV	N for IV
Age	11.88	11.59	0.00	-2.59	1,716
	0.05	*0.11*	.	1.72	
Height (cm)	132.33	130.77	-0.50	-16.07	1,716
	0.43	*0.91*	*0.68*	13.35	
Weight (kg)	31.78	31.66	0.32	-8.92	1,716
	0.21	*0.47*	*0.42*	10.35	
Completed Primary School	0.40	0.51	0.12***	0.72	1,716
	0.01	*0.03*	*0.03*	0.52	
Father Completed Primary School	0.49	0.85	0.32***	1.68**	1,658
	0.01	*0.02*	*0.03*	0.83	
Enrolled (Earthquake)	0.86	0.93	0.05**	0.32	1,716
	0.01	*0.01*	*0.02*	0.36	
Enrolled (Survey)	0.89	0.97	0.04**	0.52	1,716
	0.01	*0.01*	*0.02*	0.39	
Private School (Earthquake)	0.16	0.33	0.15***	-0.24	1,502
	0.01	*0.03*	*0.03*	0.73	
Private School (Survey)	0.17	0.27	0.07***	-0.36	1,553
	0.01	*0.03*	*0.02*	0.64	
(log) Consumption per Capita	9.85	10.08	-0.00	-0.94	1,716
	0.02	*0.04*	.	1.06	
Household Asset Index	-0.06	0.64	0.57***	0.64	1,716
	0.02	*0.05*	*0.05*	1.41	
Log Distance to Nearest Gov't School (min)	2.79	2.65	-0.17***	-1.02	1,715
	0.02	*0.04*	*0.04*	1.26	
Log Distance to Nearest Market (min)	3.69	3.35	-0.27***	-0.36	1,715
	0.02	*0.05*	*0.05*	1.78	
Log Distance to Nearest Distr Office (min)	4.84	4.71	-0.06*	0.65	1,708
	0.02	*0.04*	*0.04*	1.10	
Log Distance to Nearest Medical (min)	3.83	3.64	-0.15***	0.10	1,712
	0.02	*0.04*	*0.05*	1.30	
Log Distance to Nearest Private School (min)	3.40	3.12	-0.24***	1.17	1,647
	0.03	*0.05*	*0.06*	1.73	
Number of observations	1,559	315	.		

Notes: This table reports means and estimated differences between children whose mothers completed primary school and those who did not, using both OLS and IV specifications. Controls are included for distance to the epicenter, local slope, the nearest fault line, child gender, household assets, and individual age indicator variables.

Table A3c: Estimated maternal education effects with birth village fixed effects

	(1)	(2)	(3)	(4)
	No Clustering		Current Village Clustering	
	Maternal Education	Maternal Education Interaction	Maternal Education	Maternal Education Interaction
Panel A: Reduced Form				
Distance from Faultline (km)	0.022	0.022	0.022	0.022
	(0.020)	(0.020)	(0.016)	(0.016)
Girls' School Present by Age 8?	0.035	0.162	0.035	0.162
	(0.085)	(0.116)	(0.122)	(0.189)
Instrument * Distance		-0.008		-0.008
		(0.005)		(0.009)
Panel B: Instrumental Variables				
Distance from Faultline (km)	0.020	0.019	0.020	0.019
	(0.019)	(0.020)	(0.015)	(0.018)
Mother Completed Primary School	0.289	1.426	0.289	1.426
	(0.647)	(1.095)	(0.948)	(1.761)
Mother's Education * Distance		-0.057*		-0.057
		(0.033)		(0.067)
Dependent Variable Mean	*0.135*	*0.135*	*0.135*	*0.135*
Birth Village Fixed Effects	X	X	X	X
Geographic Controls	X	X	X	X
Individual and SES Controls	X	X	X	X
Age Dummies	X	X	X	X
Number of Observations	1,716	1,716	1,716	1,716

Notes: This table reproduces our preferred specifications from Table 4b including maternal birth village fixed effects. In Panel A this is done as a reduced form and the reported coefficients are those of the instrument and the instrument interacted with the distance to Faultline; in Panel B these are the same instrumental variables estimates with the additional control added. Controls are included for distance to the epicenter, local slope, the nearest fault line, child gender, and individual age indicator variables for mother and child.

Table A3d: Estimated maternal education effects for children with no school option

	(1)	(2)	(3)	(4)
	OLS		IV	
	Maternal Education	Interaction	Maternal Education	Interaction
Distance from Faultline (km)	0.005	0.007	0.017	0.084
	(0.007)	(0.007)	(0.014)	(0.522)
Mother Completed Primary School	0.217*	0.681***	0.793	57.743
	(0.109)	(0.181)	(1.386)	(447.996)
Interaction		-0.029***		-2.565
		(0.009)		(19.598)
Male	0.043	0.054	0.072	0.485
	(0.082)	(0.080)	(0.084)	(3.538)
Number of observations	573	573	539	539
First Stage F-stat	0.035	0.035	0.036	0.036

Notes: This table reproduces our preferred mitigation specifications, restricting the sample to children who do not have another school located in their village that enrolls students of their gender. Controls are included for distance to the epicenter, local slope, the nearest fault line, child gender, and individual age indicator variables.

Table A3e. Alternative mitigation specifications for earthquake effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Test Scores			Height (In Utero & Ages 0-2)		
	Maternal Mental Health	Household Elevation	Household Assets	Maternal Mental Health	Household Elevation	Household Assets
Distance from Faultline (km)	0.009**	0.012**	0.011**	0.034**	0.047**	0.012
	(0.004)	(0.005)	(0.004)	(0.014)	(0.018)	(0.013)
Above Median Maternal Mental Health, Household Elevation, or Assets	0.074	-0.040	0.305***	0.703**	0.961**	-0.267
	(0.073)	(0.106)	(0.088)	(0.346)	(0.430)	(0.395)
Mitigator * Distance Interaction (km)	-0.004	-0.007	-0.007*	-0.047***	-0.041**	0.016
	(0.003)	(0.005)	(0.004)	(0.016)	(0.021)	(0.018)
Mother Completed Primary School	0.306***	0.276***	0.267***	0.003	0.122	0.089
	(0.056)	(0.054)	(0.053)	(0.231)	(0.227)	(0.235)
Male	0.061	0.075*	0.074*	-0.114	-0.152	-0.150
	(0.044)	(0.042)	(0.043)	(0.188)	(0.166)	(0.166)
Number of observations	1,705	1,875	1,875	1,224	1,423	1,423
Regression R2	0.102	0.114	0.118	0.042	0.036	0.031
Dependent Variable Mean	0.130	0.131	0.131	-1.632	-1.676	-1.676

Note: This table reproduces our preferred OLS mitigation specifications, in each case replacing maternal primary education with one of three alternative mitigating factors: maternal mental health measured in the upper half of the distribution; household elevation in the upper half of the distribution; and households with assets in the upper half of the distribution. The level effects and interaction terms are reported for each combination. Controls are included for distance to the epicenter, local slope, the nearest fault line, child gender, and individual age indicator variables.

Table A4a. Alternative aid control specifications for main earthquake effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Weight (Z-score)	Height (Z-score)	School Enrollment	Grade Attainment	Test Scores (IRT)	Test Scores + Disruption	Test Scores + Gender	Test Scores + Age
Distance from Faultline (km)	-0.007	0.003	-0.000	0.001	0.008**	0.006*	0.007	0.012**
	(0.004)	*(0.005)*	*(0.001)*	*(0.008)*	*(0.004)*	*(0.003)*	*(0.005)*	*(0.005)*
Weeks out of School After Earthquake						-0.004*		
						(0.002)		
In Utero * Distance from Faultline (km)	0.003	0.036**						
	(0.006)	*(0.017)*						
Age 0-2 * Distance from Faultline (km)	0.005	0.015*						
	(0.005)	*(0.009)*						
Total Cash Aid Reported (PKR 100,000s)	0.018	0.043	-0.008	-0.079	-0.025	-0.015	-0.024	-0.025
	(0.043)	*(0.059)*	*(0.009)*	*(0.093)*	*(0.038)*	*(0.035)*	*(0.038)*	*(0.038)*
Male	-0.041	0.035	0.077***	0.121	0.067	-0.000	0.043	0.065
	(0.048)	*(0.082)*	*(0.016)*	*(0.107)*	*(0.044)*	*(0.045)*	*(0.074)*	*(0.044)*
Distance from Faultline (km) * Male							0.001	
							(0.004)	
Distance from Faultline (km) * Age 6								-0.005
								(0.004)
Distance from Faultline (km) * Age 7								-0.003
								(0.005)
Distance from Faultline (km) * Age 8								-0.007
								(0.005)
Distance from Faultline (km) * Age 9								0.005
								(0.005)
Distance from Faultline (km) * Age 10								-0.009*
								(0.004)
Distance from Faultline (km) * Age 11								-0.008
								(0.006)
Dependent Variable Mean	*-0.944*	*-2.155*	*0.903*	*4.173*	*0.131*	*0.229*	*0.131*	*0.131*
Regression R2	0.247	0.077	0.072	0.335	0.089	0.103	0.090	0.095
Number of Observations	4,002	4,001	1,874	1,875	1,875	1,547	1,875	1,875
Geographic Controls	X	X	X	X	X	X	X	X
Age Dummies	X	X	X	X	X	X	X	X

Note: This table reproduces our preferred OLS main specifications from Table 3, with the total cash aid to the household included as an additional control variable. The dependent variables are indicated in column names. The regressions include controls for distance to the earthquake epicenter, local slope, distance to the nearest fault line, and district fixed effects, as well as indicator variables for the age of the child. Significance levels are indicated by stars as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A4b. Alternative controls specifications for main earthquake effects

	(1) Original Result Reference	(2) Remove Gender Control	(3) Remove Age Control	(4) Remove Geographic Controls	(5) Remove District FE
Panel A: Test Scores (Table 3, Column 5)					
Distance from Faultline (km)	0.009**	0.009**	0.008**	0.004	0.004
	(0.004)	*(0.004)*	*(0.004)*	*(0.003)*	*(0.002)*
Dependent Variable Mean	*0.131*	*0.131*	*0.131*	*0.131*	*0.131*
Regression R2	0.089	0.087	0.034	0.021	0.004
Number of Observations	1,875	1,875	1,875	1,875	1,875
Panel B: Height (Table 3, Column 2)					
Distance from Faultline (km)	0.002	0.002	0.001	-0.002	0.000
	(0.005)	*(0.005)*	*(0.005)*	*(0.005)*	*(0.003)*
In Utero * Distance from Faultline (km)	0.036**	0.036**	0.037**	0.037**	0.038**
	(0.017)	*(0.017)*	*(0.017)*	*(0.017)*	*(0.016)*
Age 0-2 * Distance from Faultline (km)	0.015*	0.015*	0.015*	0.015*	0.016*
	(0.009)	*(0.009)*	*(0.009)*	*(0.009)*	*(0.009)*
Dependent Variable Mean	*-2.155*	*-2.155*	*-2.155*	*-2.155*	*-2.155*
Regression R2	0.077	0.077	0.037	0.034	0.032
Number of Observations	4,001	4,001	4,001	4,001	4,001
District Fixed Effects	X	X	X	X	
Geographic Controls	X	X	X		
Age Dummies	X	X			
Gender Control	X				

Note: This table reproduces two of our preferred OLS main specifications from Table 3, with sets of control variables progressively removed from the main specification. The dependent variables are indicated in panel titles. The original reference regressions include controls for distance to the earthquake epicenter, local slope, distance to the nearest fault line, and district fixed effects, as well as indicator variables for the gender and age of the child. Significance levels are indicated by stars as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A4c. Alternative exposure measure specifications for main earthquake effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Weight (Z-score)	Height (Z-score)	School Enrollment	Grade Attainment	Test Scores (IRT)	Test Scores + Disruption	Test Scores + Gender	Test Scores + Age
Local Earthquake Intensity	0.091	-0.052	-0.012	-0.117	-0.117**	-0.100**	-0.127**	-0.162**
	(0.067)	*(0.075)*	*(0.015)*	*(0.121)*	*(0.051)*	*(0.047)*	*(0.060)*	*(0.063)*
Weeks out of School After Earthquake						-0.004*		
						(0.002)		
In Utero * Local Intensity	0.092	-0.182						
	(0.083)	*(0.211)*						
Age 0-2 * Local Intensity	0.015	-0.166*						
	(0.059)	*(0.098)*						
Male	-0.041	0.038	0.076***	0.117	0.068	0.001	-0.088	0.066
	(0.048)	*(0.081)*	*(0.016)*	*(0.106)*	*(0.045)*	*(0.045)*	*(0.347)*	*(0.044)*
Local Intensity * Male							0.021	
							(0.045)	
Local Intensity * Age 6								0.021
								(0.053)
Local Intensity * Age 7								0.020
								(0.065)
Local Intensity * Age 8								0.087
								(0.059)
Local Intensity * Age 9								-0.019
								(0.063)
Local Intensity * Age 10								0.117**
								(0.058)
Local Intensity * Age 11								0.064
								(0.072)
Dependent Variable Mean	*-0.944*	*-2.155*	*0.903*	*4.173*	*0.131*	*0.229*	*0.131*	*0.131*
Regression R2	0.247	0.074	0.072	0.336	0.088	0.103	0.088	0.092
Number of Observations	4,002	4,001	1,874	1,875	1,875	1,547	1,875	1,875
Geographic Controls	X	X	X	X	X	X	X	X
Age Dummies	X	X	X	X	X	X	X	X

Note: This table reproduces our preferred OLS main specifications from Table 3, with the distance to the fault line exposure measure replaced by the local Mercalli intensity of the earthquake. The dependent variables are indicated in column names. The regressions include controls for distance to the earthquake epicenter, local slope, distance to the nearest fault line, and district fixed effects, as well as indicator variables for the age of the child. Significance levels are indicated by stars as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A4d. Alternative fertility selection specifications for main earthquake effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Weight (Z-score)	Height (Z-score)	School Enrollment	Grade Attainment	Test Scores (IRT)	Test Scores + Disruption	Test Scores + Gender	Test Scores + Age
Distance from Faultline (km)	-0.008*	0.001	0.000	0.000	0.007**	0.006*	0.007	0.011**
	(0.004)	*(0.005)*	*(0.001)*	*(0.009)*	*(0.003)*	*(0.003)*	*(0.005)*	*(0.005)*
Weeks out of School After Earthquake						-0.004		
						(0.003)		
In Utero * Distance from Faultline (km)	0.001	0.037**						
	(0.007)	*(0.017)*						
Age 0-2 * Distance from Faultline (km)	0.005	0.014						
	(0.005)	*(0.008)*						
Male	-0.031	0.021	0.078***	0.112	0.059	-0.002	0.031	0.055
	(0.056)	*(0.084)*	*(0.018)*	*(0.115)*	*(0.046)*	*(0.046)*	*(0.074)*	*(0.046)*
Distance from Faultline (km) * Male							0.002	
							(0.004)	
Distance from Faultline (km) * Age 6								-0.005
								(0.004)
Distance from Faultline (km) * Age 7								-0.003
								(0.005)
Distance from Faultline (km) * Age 8								-0.006
								(0.005)
Distance from Faultline (km) * Age 9								0.007
								(0.005)
Distance from Faultline (km) * Age 10								-0.006
								(0.005)
Distance from Faultline (km) * Age 11								-0.007
								(0.006)
Dependent Variable Mean	*-0.938*	*-2.157*	*0.904*	*4.145*	*0.136*	*0.230*	*0.136*	*0.136*
Regression R2	0.256	0.086	0.091	0.362	0.131	0.141	0.131	0.136
Number of Observations	3,418	3,417	1,573	1,574	1,574	1,310	1,574	1,574
Family Controls	X	X	X	X	X	X	X	X
Geographic Controls	X	X	X	X	X	X	X	X
Age Dummies	X	X	X	X	X	X	X	X

Note: This table reproduces our preferred OLS main specifications from Table 3, with additional controls included for parental age, educational achievement, and height, as well as head-of-household employment. The dependent variables are indicated in column names. The regressions include controls for distance to the earthquake epicenter, local slope, distance to the nearest fault line, and district fixed effects, as well as indicator variables for the age of the child. Significance levels are indicated by stars as follows: *** p<0.01, ** p<0.05, * p<0.1

Table A4e. Alternative density selection specifications for main earthquake effects

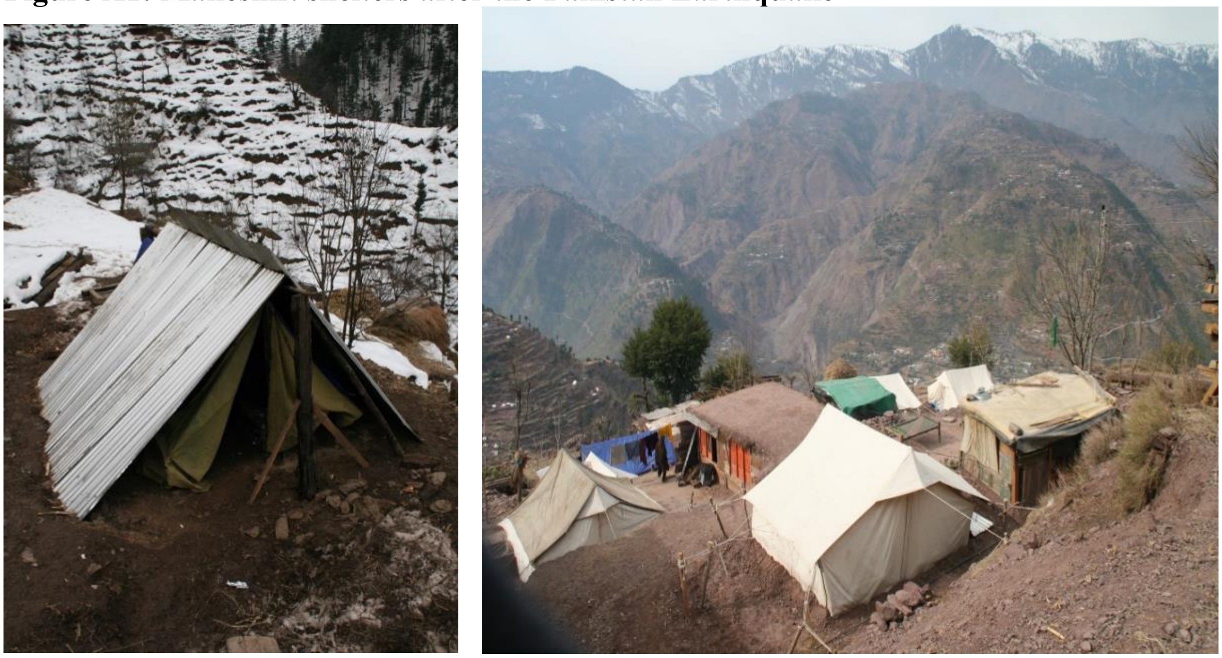
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Weight (Z-score)	Height (Z-score)	School Enrollment	Grade Attainment	Test Scores (IRT)	Test Scores + Disruption	Test Scores + Gender	Test Scores + Age
Distance from Faultline (km)	-0.008*	0.003	-0.000	0.003	0.007*	0.006	0.006	0.009*
	(0.005)	*(0.005)*	*(0.001)*	*(0.009)*	*(0.004)*	*(0.004)*	*(0.005)*	*(0.005)*
Children per School in Village	0.000	-0.000	-0.000**	-0.002*	-0.001**	-0.000	-0.001**	-0.001**
	(0.000)	*(0.001)*	*(0.000)*	*(0.001)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Weeks out of School After Earthquake						-0.005**		
						(0.002)		
In Utero * Distance from Faultline (km)	0.003	0.034*						
	(0.006)	*(0.017)*						
Age 0-2 * Distance from Faultline (km)	0.005	0.016						
	(0.005)	*(0.010)*						
Male	-0.045	0.017	0.066***	0.065	0.048	-0.002	0.014	0.045
	(0.051)	*(0.087)*	*(0.016)*	*(0.107)*	*(0.045)*	*(0.047)*	*(0.077)*	*(0.045)*
Distance from Faultline (km) * Male							0.002	
							(0.004)	
Distance from Faultline (km) * Age 6								-0.002
								(0.004)
Distance from Faultline (km) * Age 7								-0.001
								(0.005)
Distance from Faultline (km) * Age 8								-0.005
								(0.005)
Distance from Faultline (km) * Age 9								0.008*
								(0.005)
Distance from Faultline (km) * Age 10								-0.005
								(0.005)
Distance from Faultline (km) * Age 11								-0.002
								(0.005)
Dependent Variable Mean	*-0.950*	*-2.171*	*0.907*	*4.210*	*0.146*	*0.230*	*0.146*	*0.146*
Regression R2	0.252	0.078	0.077	0.332	0.092	0.101	0.092	0.096
Number of Observations	3,712	3,711	1,747	1,748	1,748	1,465	1,748	1,748
Family Controls	X	X	X	X	X	X	X	X
Geographic Controls	X	X	X	X	X	X	X	X
Age Dummies	X	X	X	X	X	X	X	X

Note: This table reproduces our preferred OLS main specifications from Table 3, with the average number of children per school in each village included as an additional control variable. The dependent variables are indicated in column names. The regressions include controls for distance to the earthquake epicenter, local slope, distance to the nearest fault line, and district fixed effects, as well as indicator variables for the age of the child. Significance levels are indicated by stars as follows: *** p<0.01, ** p<0.05, * p<0.1

Table A5. Review of effect sizes in height literature

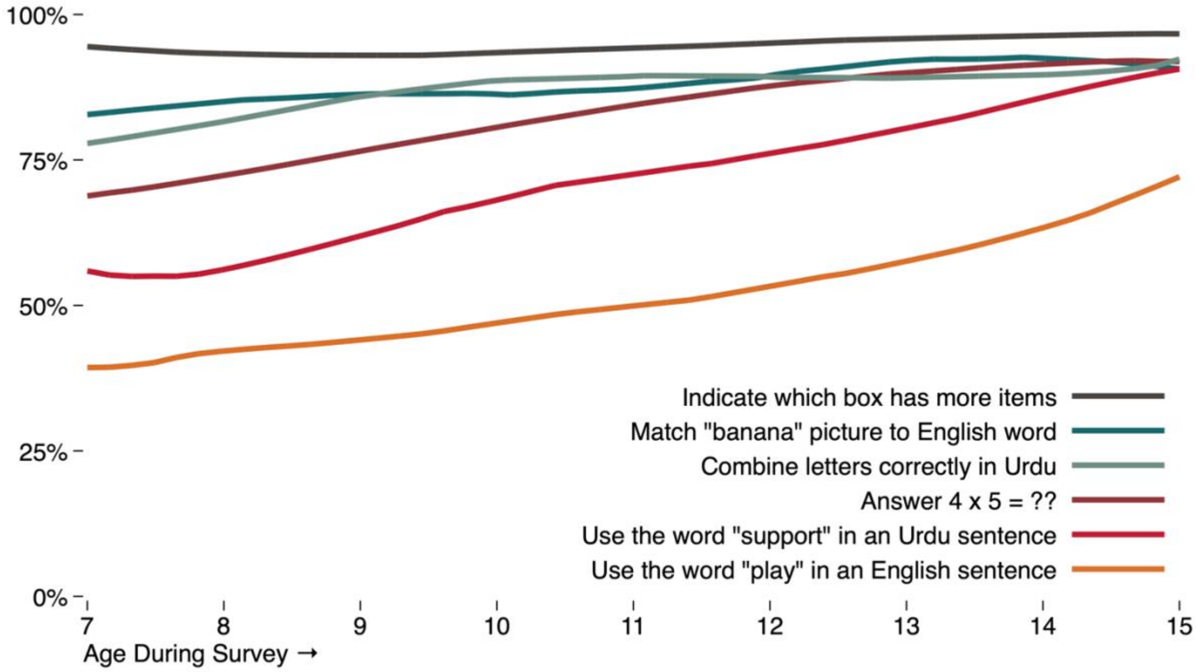
Study	Methodology	Shock	Height Effects
Akresh, Lucchetti, & Thirumurthy (2012)	Regional exposure comparisons Measurements taken in 2002	Ethiopian war with Eritrea 1998-2000	Children exposed to war aged 0-3: –0.4 SD
Akresh, Verwimp, & Bundervoet (2011)	Comparison to exposed cohorts against those living in rest of country. Measurements taken 2-4 years after shock (1992).	Rwanda 1988-89 crop failure	Boys age 0-4 in period: Null effect Boys born in period: Null effect Girls age 0-4 in period: –0.1 SD Girls born in period: –0.6 SD
Akresh, Verwimp, & Bundervoet (2011)	Comparison to exposed cohorts against those living in rest of country. Measurements taken 2-4 years after shock (1992).	Rwanda 1990-91 civil war	Boys age 0-4 in period: –0.2 SD Boys born in period: –1.0 SD Girls age 0-4 in period: –0.2 SD Girls born in period: –0.7 SD
Alderman, Hoddinott, & Kinsey (2006)	Comparison to other children of same mother (fixed effects). Measurements taken 16-20 years after shock (2000).	Zimbabwe 1970's civil war	–0.035 SD x log(Days of exposure to conflict before 1980)
Alderman, Hoddinott, & Kinsey (2006)	Comparison to other children of same mother (fixed effects). Measurements taken 16-20 years after shock (2000).	Zimbabwe 1982-84 drought	Children aged 12-36 months: –0.6 SD
Banerjee et al (2007)	Comparison to birth cohorts born outside phylloxera years. Measurement at 20 years of age (male military service)	France phylloxera (1850s-1870s)	Born in affected year in wine-producing family: –0.5cm
Bundervoet, Verwimp, & Akresh (2009)	Regional exposure comparisons Measurements taken in 1998-99	Burundi civil war (1994-1998)	Children exposed to war aged 0-4: –0.05 SD per month
Dercon & Porter (2014)	Sibling comparisons Measurements taken in 2004 among those aged 17-27	Ethiopian famine of 1984	Children aged 12-36 months: –5cm Children in utero: Null effect
Groppo & Kraehnert (2016)	Comparison across exposure intensity Measurements taken in 2013-13 and 2013-14	Mongolian dzud winter of 2009-2010	Children exposed in utero: –1.2 SD Children exposed age 0-6: Null effect
Hoddinott & Kinsey (2001)	Comparison to children born prior to drought. Measurements taken 4 years after shock (1999).	Zimbabwe 1994-95 drought	Children aged 12-24 months: –0.6 SD Children aged 24-60 months: Null effect
Maccini & Yang (2009)	Comparison of local birth-year rainfall between 1953 and 1974 Measurements taken for adults in 2000	Indonesian rainfall variation in first year of life (per –20%/1SD below average rainfall)	Girls age 0-12 months: –0.6cm Girls age 12+ months: Null effect Boys age 0-12 months: Null effect Boys age 12+ months: Null effect
Rosales (2014)	Cohort comparisons Measurements taken in 2003-04 and 2005-06	Ecuador exposure to El Nino	Children in utero: –0.1 SD
Weldeegzie (2017)	Difference-in-difference (regional and cohort) Measurements taken in 2001-2009	Ethiopian war with Eritrea 1998-2000	Children exposed to war aged 0-6: –0.3 SD
Wierzba et al (2001)	22-month panel of children aged 0-3	Egypt diarrhea	Episode in last 90 days: –0.6 SD Eipsode in prior 90 days: null effect

Figure A1: Makeshift shelters after the Pakistan Earthquake



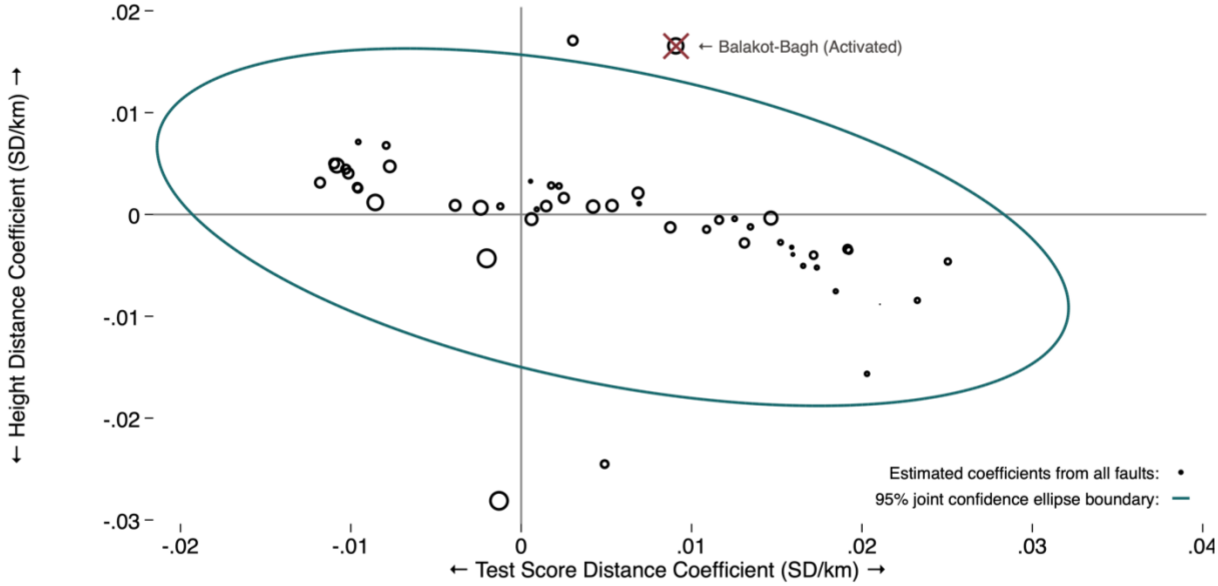
Notes: Photos by Das, taken in December 2005 in the Neelum Valley. Shelters after the earthquake reflect differences across households, ranging from a small lean-to to more extensive tents. Note that even when houses were not fully destroyed, people chose not to live in them because of the large number of after-shocks that continued.

Figure A2: Demonstrative test questions from educational attainment



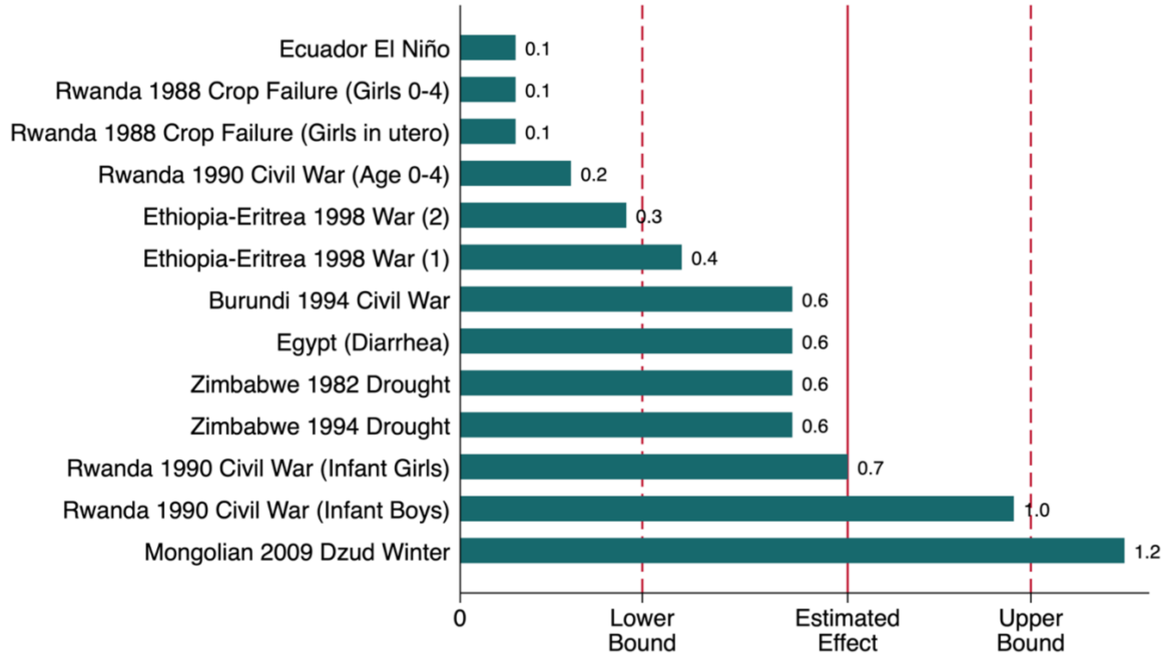
Notes: This figure illustrates results for some demonstrative questions from the knowledge exam in English, math, and Urdu administered to children in the detailed survey sample from ages 7-15 at the time of the survey. Ages at the time of the earthquake are 4 years younger.

Figure A3. Placebo fault lines simulation for primary earthquake effects



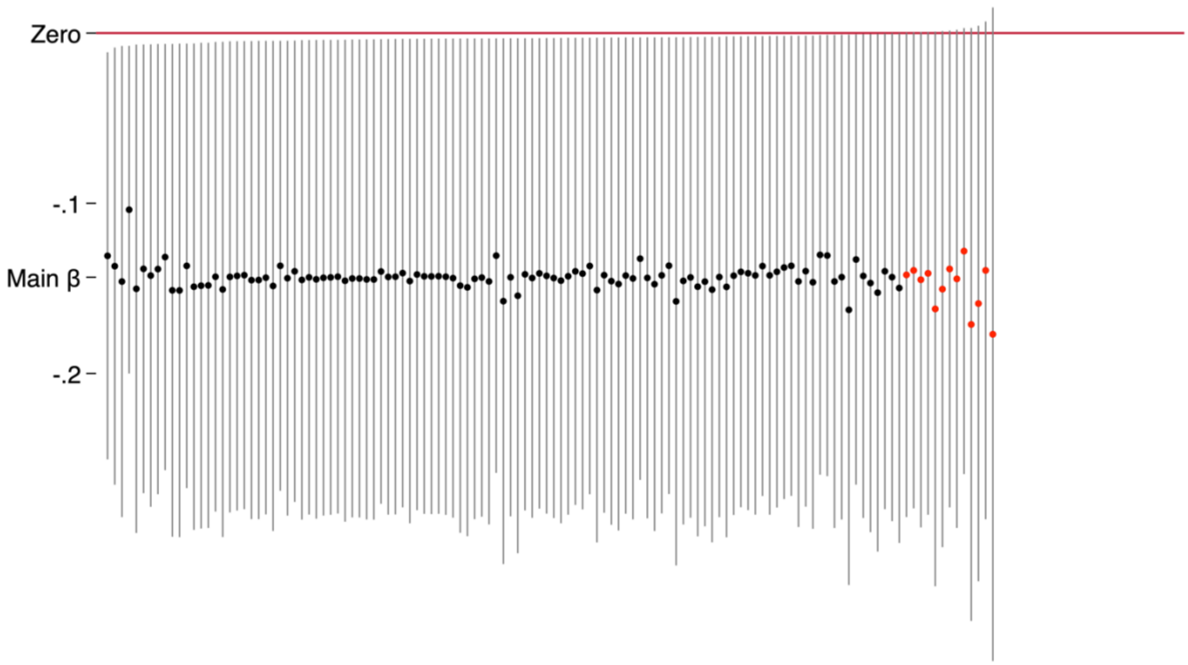
Notes: This figure illustrates the joint distribution of placebo distance coefficients for non-activated fault lines, for both test scores and for child heights (in utero – age 2). The estimated counterfactuals are obtained by calculating the distance from each household to the other 50 non-activated fault line segments in the study area, then running the primary effects regression with that distance for each such fault line included. The size of the marker indicates the relative size (length in km) of the fault line; the Balakot-Bagh Fault marker (highlighted with X) represents the activated fault line and the corresponding effect estimates from our main specifications. The ellipse indicates the 95% confidence area for the joint distribution of effect estimates from the non-activated fault lines.

Figure A4. Height-for-age Z-score effect sizes from relevant literature



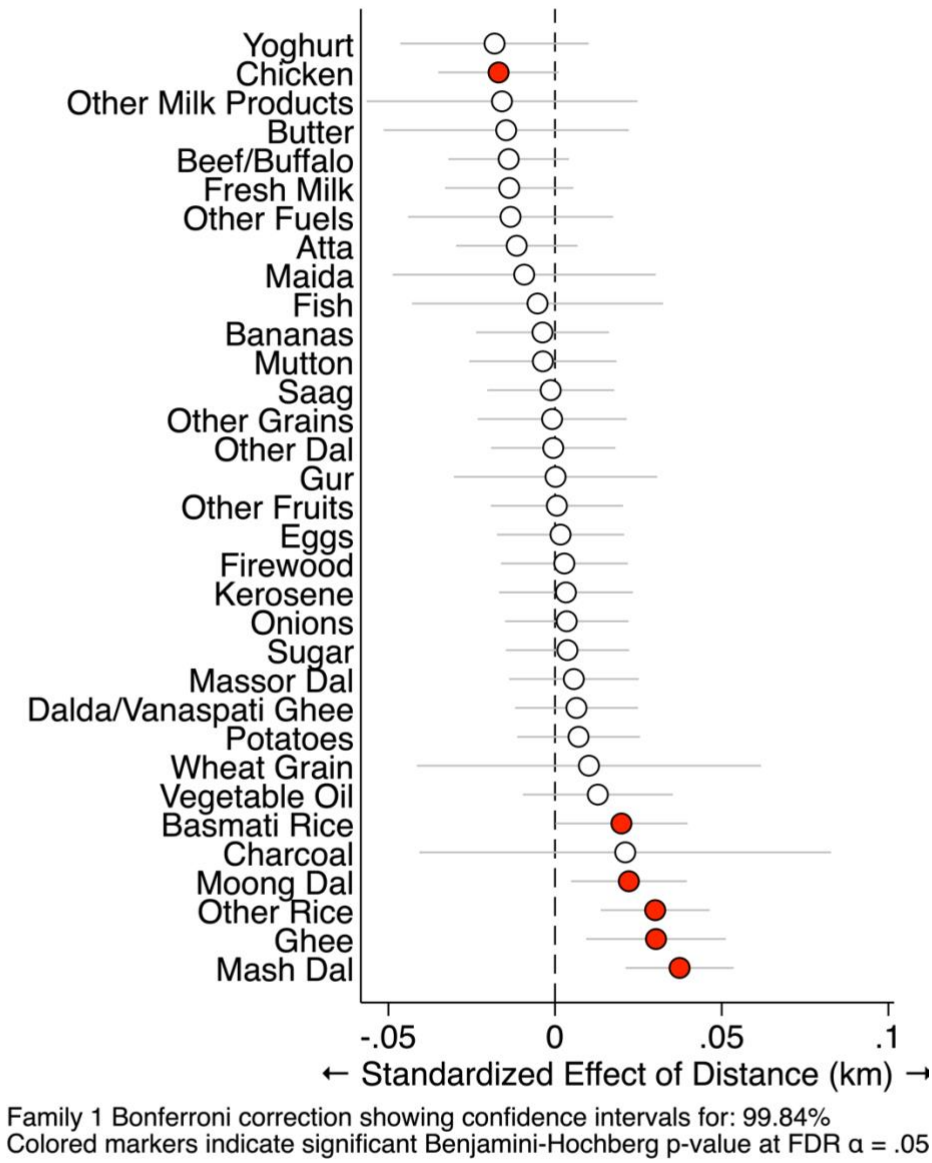
Notes: This figure illustrates the height-for-age Z-score impacts estimated in other studies of disaster impacts on the very young. For reference, it indicates the estimated effect in our pooled results for children *in utero* to age 2 at the time of the earthquake and the corresponding bounds on that effect size accounting for selection.

Figure A5. Instrumental variables leave-one-out regression results



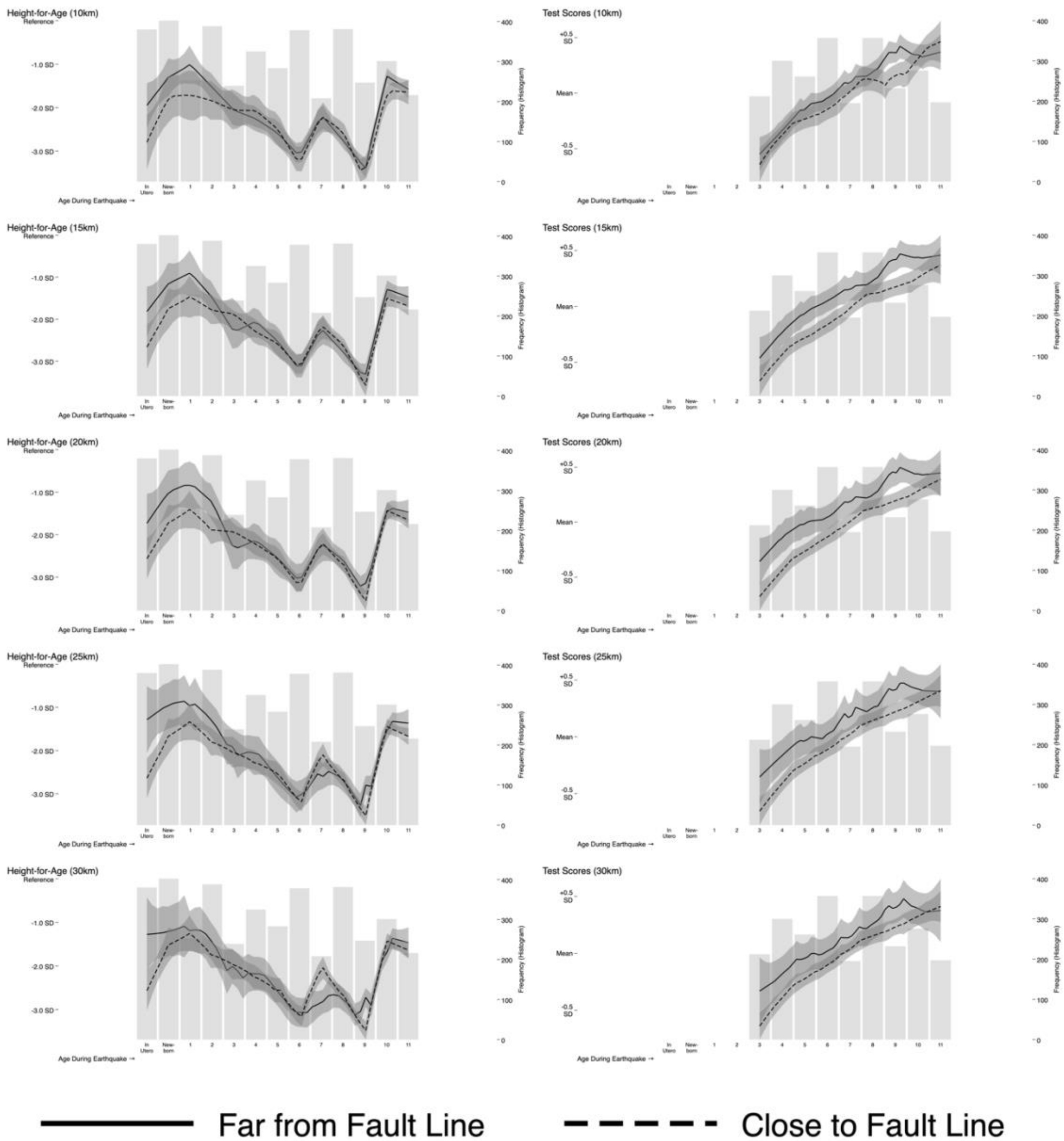
Notes: For each cluster (village) in our test scores maternal education mitigation IV specification, we repeat the estimation excluding that village. This figure plots the distribution of mitigation coefficients we obtain from this set of regressions. The dots represent the individual point estimates; the lines illustrate the corresponding 95% confidence intervals. Estimates are ordered by the magnitude of the upper bound of the confidence interval; those whose confidence intervals include zero are marked in red.

Figure A6. Regression of earthquake effect on village level food/fuel prices



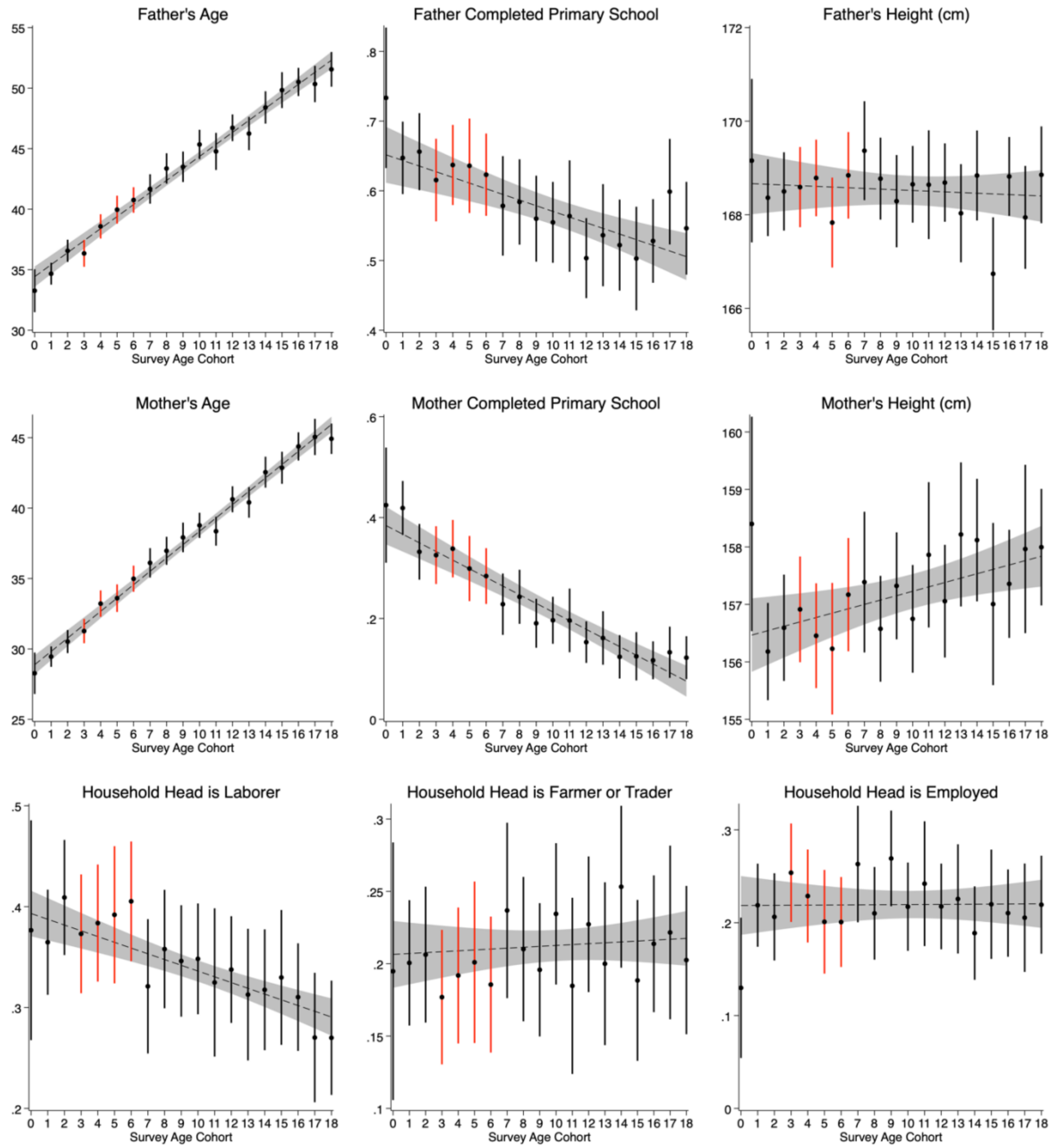
Notes: At the village level (N=126), this figure reports the results of regressions of the average price for each of a basket of food and fuel items which were queried as part of the household consumption questionnaire module at the time of the survey. Prices are standardized to a mean of zero and regressed against the average village distance to the activated fault line. Standard errors are adjusted for multiple hypothesis testing and significant results are indicated with colored markers after applying the Benjamini-Hochberg procedure.

Figure A7. Alternative near/far cutoff specifications for earthquake effect



Notes: This figure re-produces results from Figure 6b and Figure 7a in the main text, varying the location of the near/far cutoff from 10km to 30km to illustrate the effect of altering sample definitions on the results. The 20km cutoff is used in the main figures.

Figure A8. Birth cohort selection analysis



Notes: This figure illustrates the results of a fertility selection analysis as suggested in Brown and Thomas (2018). Here, we calculate point estimates and confidence intervals for a variety of household and parental characteristics for children born in each cohort year. We highlight in red the affected cohorts, here defined as children aged 3-6 years at the time of the survey (four years younger during the earthquake). The illustrated linear time trend and confidence interval are calculated from non-affected cohorts for comparison.