*A little help may be no help at all: size of scholarships and child labour in Nepal*

***Supplementary Material***

***Alternative estimator and selection on unobservables***

Given that CEM is a relatively new matching estimator, we first inquire into whether our main results in Table 4 are robust to an alternative (more-established) matching estimator, and find that they are also supported by the PSM estimates reported in Table S1. As seen in Table S1, girls who receive high-value scholarships are estimated to work 4.9 fewer hours per week than girls without scholarships, and most of the effect is through reduction in hours of extended-economic and economic work. Parallel to the CEM results (Table 4), the impact declines in magnitude as we move from higher to lower-value scholarships (though the impact at the 5% and 4% thresholds is much the same at about -5 hours per week). The impact on boys' work, though still negative at the 5% threshold, is not statistically significant. In general, although PSM treatment effects for girls and boys are smaller in magnitude than the corresponding CEM effects in Table 4, they lend support to our main findings on size effects based on the CEM estimates.

However, both the CEM and PSM estimators match on observables and hence leave open the possibility of bias due to (the uncontrolled) selection on unobservables. We are not in a position to conduct a randomized control trial in this setting of an already well-established schooling scholarship program. Nor are we in a position to exploit panel data to control for unobservables. While NLSS3 for 2010 does contain a smaller panel component with NLSS2 for 2003, the two surveys being 7-years apart implies that most of the 8-16 year cohort in 2003 would have graduated into working age by 2010, and similarly most of the 8-16 year cohort in 2010 would be less than 8 years old in 2003.[1] However, we explore this issue by conducting an experiment pretending some of the observed variables to be unobservable and using the resulting change in treatment effects to infer the nature of bias.

In particular, we focus on the possibility of scholarship allocations being based on unobserved "need" of school-age children. Heeding back to the discussion in section 2.3 on the

[1] This rules out using child or household effects to control for all time-invariant unobservables. However, even without panel data we are still able to allow for some time-invariant factors, such as parental education, in our estimation framework.

administration of scholarship programs in Nepal, recall that in an environment of inadequate scholarship quotas, head teachers often make the call as to who are the most 'poor and deserving' candidates for scholarships. Thus, individual need assessment (who is most in need of a scholarship) is potentially an important factor influencing allocation of scholarships. Need assessment may be partly based on observables such as indicators of socio-economic status of the parents, but may also have unobservable elements. Amongst our coarsened set of variables, two observables related to the family standard of living that are indicative of need are: rooms per capita, and a categorical variable indicating whether the household has none, one or more of: piped water, underground drainage for liquid waste, flush toilet, electricity/solar source of lighting. We experimentally assume that these two variables are unobservable and hence unavailable for the estimation of the CEM treatment effects.

With this assumption, Table S2 reports the resulting estimates for girls[2], which can be directly compared with corresponding estimates in Table 4 for girls based on all observed variables. The comparison shows a systematic pattern. If we denote the treatment effects in Table S2 as $ATT^{O}$ (i.e. treatment effects based on the abridged set of observables, omitting variables presumed unobservable) and those in Table 4 as $ATT^{O+U}$ (i.e. effects based on the full set of variables including both presumed observable and unobservable), then the comparison shows that in *all* cases $ATT^{O+U} < ATT^{O}$.

Since the relevant treatment effects (at 3-5% thresholds) are negative, the comparison thus reveals that when unobservables related to need are included, the child labour-reducing effects of scholarships tend to be larger. The intuition for this finding is not difficult to see, for we know in a parametric regression context, the bias on account of the omitted ("unobserved") variables is given by:

$$ATT^{O} \underset{\rightarrow}{\overset{p}{}} ATT^{O+U} + \lambda'^{H}_{X^{U}|\,S,X^{O}} \; \pi^{X^{U}}_{S|\,X^{O}}$$

Where $\lambda'^{H}_{X^{U}|\,S,X^{O}}$ represents the effect of omitted need variables, $X^{U}$, on hours of child labour (conditional on scholarships $S$ and other observables $X^{O}$), and $\pi^{X^{U}}_{S|\,X^{O}}$ represents the slope coefficients of the unobserved need variables $X^{U}$ with respect to scholarships (conditional on observables $X^{O}$). The latter is expected to be positive since children in greater need are more likely to receive scholarships and the former is also expected to be positive since children from

[2] We limit this analysis to girls only as the treatment effects for boys are found to be insignificant.

more needy backgrounds are also more likely to be engaged in more child labour. Thus, selection on unobservables related to need is likely to induce a positive bias, which is exactly what we find. Thus, our estimates in Table 4 may be interpreted as under-estimating the child labour-reducing effects of scholarships for any further selection related to unobserved need.

In reality, of course, not all unobservables may be related to need, and indeed there may be some that may induce a negative bias, for instance, those related to child "ability" which may be expected to be negatively related to child labour while being positively associated with scholarships. We also experimented with the omission of parental education variables as a potential (though imperfect) proxy for child ability, but found this to have no effect on the estimated scholarship impacts on child labour.[3]

There could of course be still other unobservables, e.g. due to favouritism or bribery, influencing the award of scholarships. However, we believe that the impact of such factors on our results should be negligible in light of the reported tendency of teachers (noted in section 2.3 of the main paper) to spread inadequate scholarship funding across many students. In addition, the above experiments indicate a measure of robustness of our results. They suggest that (i) for a plausible set of unobservables, the direction of bias tends to be positive implying even larger child labour-reducing effects of scholarships than those implied by our estimates,, (ii) other unobservables that may induce a negative bias would have to be sufficiently strong to produce a net negative bias or reverse the estimated impacts on child labour, and (iii) significantly for our context, they need not affect the findings on size effects as the magnitude of bias for a given unobservable seems similar for scholarships of different sizes (as seen in the experiments above).

[3] Results not reported but available from the authors upon request.

**Table S1: Effect of scholarships *of different values* on child labour hours per week for 8-16 year old girls and boys: PSM estimates (radius matching with common support)**

| | Scholarship value threshold as % of Nepalese poverty line | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Work hours per week** | **2%** | **3%** | **4%** | **5%** | **2%** | **3%** | **4%** | **5%** |
| | **Girls** | | | | **Boys** | | | |
| **Total** | 1.324 | -4.169*** | -5.008*** | -4.908*** | -0.008 | 0.640 | 0.244 | -2.134 |
| | (1.281) | (1.540) | (1.540) | (1.712) | (1.397) | (1.821) | (2.116) | (1.422) |
| **Economic** | -0.158 | -2.034*** | -2.097*** | -1.765** | -0.027 | 0.210 | 0.791 | -1.758* |
| | (0.647) | (0.643) | (0.708) | (0.814) | (1.099) | (1.479) | (1.736) | (0.050) |
| **Extended-economic** | 0.415 | -1.989*** | -2.586*** | -2.827*** | -0.391 | -0.875 | -0.546 | -0.415 |
| | (0.545) | (0.701) | (0.657) | (0.773) | (0.524) | (0.597) | (0.659) | (0.702) |
| **Domestic chores** | 1.067* | -0.147 | -0.324 | -0.316 | 0.410 | 0.025 | -0.002 | 0.039 |
| | (0.603) | (0.828) | (0.873) | (0.940) | (0.336) | (0.436) | (0.496) | (0.556) |
| **Economic + extended-economic** | 0.257 | -4.023*** | -4.683*** | -4.592*** | -0.418 | -0.665 | 0.245 | -2.173* |
| | (0.952) | (1.052) | (1.056) | (1.229) | (1.264) | (1.682) | (1.978) | (1.211) |

*Note*: Based on Nepal Living Standards Survey III, 2010.
All estimates incorporate sample weights. Standard errors in parentheses. Statistical significance is indicated as: *** p<0.01, ** p<0.05, * p<0.1.

**Table S2: Effect of scholarships *of different values* on child labour hours per week for 8-16 year old girls: CEM estimates treating some observables as unobservable ^**

| | Scholarship value threshold as % of Nepalese poverty line | | | |
|---|---|---|---|---|
| **Work hours per week** | **2%** | **3%** | **4%** | **5%** |
| | **Girls** | | | |
| **Total** | 1.073 | -5.009** | -6.555*** | -6.882** |
| | (1.322) | (2.125) | (2.427) | (2.737) |
| | [19.39] | [21.19] | [22.15] | [22.11] |
| **Economic** | 0.065 | -2.327** | -2.527* | -1.899 |
| | (0.687) | (1.139) | (1.333) | (1.507) |
| | [4.23] | [4.84] | [5.17] | [5.17] |
| **Extended-economic** | 0.132 | -1.965** | -3.095*** | -3.870*** |
| | (0.618) | (0.988) | (1.128) | (1.273) |
| | [7.04] | [7.40] | [7.66] | [7.66] |
| **Domestic chores** | 0.876 | -0.7166 | -0.932 | -1.113 |
| | (0.611) | (0.993) | (1.130) | (1.269) |
| | [8.11] | [8.94] | [9.31] | [9.28] |
| **Economic + extended-economic** | 0.197 | -4.293*** | -5.622*** | -5.769*** |
| | (1.011) | (1.639) | (1.894) | (2.141) |
| | [11.28] | [12.24] | [12.84] | [12.83] |

*Note*: Based on Nepal Living Standards Survey III, 2010.
^ These CEM treatment effects are estimating without using the observables related to rooms per capita and a categorical variable indicating whether the household has none, one or more of: piped water, underground drainage for liquid waste, flush toilet, electricity/solar source of lighting.
All estimates incorporate sample weights. Standard errors in parentheses. Mean work hours per week for the matched control group in square brackets. Statistical significance is indicated as: *** p<0.01, ** p<0.05, * p<0.1.