Development-Induced Displacement and Children's Human Capital

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Development projects are estimated to forcibly displace ten million people each year worldwide, and have done so for at least the past two decades (Cernea, 2000). This population, termed "resettlers" by Cernea, occupies a particularly precarious position among the displaced. Like refugees and internally displaced persons (IDPs), their migration is involuntary. However, their displacement is caused not by conflict or natural disaster, but by development projects or policies initiated by their own governments and often underwritten by international financial institutions. Resettlers enjoy fewer legal protections by international conventions than do refugees, and tend to command less media (and scholarly) attention than those displaced by conflict or natural disaster.

The consequences of forced resettlement can be dire. Cernea's risk and reconstruction model for displaced populations identifies eight "impoverishment risks," (Cernea, 2000, p. 14) including landlessness, food insecurity, increased morbidity, and community disarticulation. In this study we examine how these impoverishment risks negatively impact children's human capital. Using a new dataset from the Lao People's Democratic Republic (Lao PDR), we ask whether children in resettled households achieve lower stature and lower educational attainment than children in non-resettled households. We also evaluate the probable mechanisms linking resettlement to compromised human capital investments in children, including household food security, children's diet diversity, and time spent on activities other than schooling.

Studying internally displaced and resettled populations presents many methodological challenges (Jacobsen & Landau, 2003). One persistent problem is sampling, as most studies of IDPs and resettlers are based on convenience samples of already displaced populations. Our dataset offers a unique opportunity to analyze a random and representative sample of households from a region with high rates of forced resettlement. This aids considerably in causal inferences as we can construct various control groups to more precisely and accurately estimate the effects of resettlement on impoverishment and on children's human capital.

RESETTLEMENT IN LAO PDR

Internal migration in Lao PDR has taken several forms in the past century (Evrard & Goudineau, 2004). The earliest inhabitants of the region practiced semi-nomadic agriculture, with long fallow cycles and periodic movements of households and villages within large territories. Other upland (mountain-dwelling) ethnic groups who came to the region in the

nineteenth-century employed shorter cycle "slash and burn" methods with more frequent relocations. Against this backdrop, the country experienced massive internal migration during two successive wars from 1958-1975. In the post-war period, many villages and households moved again, either returning to previously held lands or responding to government incentives to settle unpopulated or politically unstable areas.

Internal resettlement as currently experienced in Lao PDR began in the early 1990s and is a more focused and intentional phenomenon (Evrard & Goudineau, 2004). The Lao government recognized that resettlement could accomplish several development and security goals. The elimination of swidden ("slash and burn") agricultural techniques, considered environmentally harmful and unsustainable, is one primary policy motivation for resettlement. The second key policy is the relocation of remote populations closer to infrastructure and services. Opium eradication, security concerns, and cultural integration and "nation-building" are also promoted as justifications for resettlement policies (Baird & Shoemaker, 2005). To accommodate resettled populations, the government has planned a series of "Focal Sites," or dense clusters of villages along roads and waterways with access to markets, health facilities, and schools. If fully implemented, the resettlement and focal site policies could displace up to half of remaining upland populations in the country's northern provinces.

A series of qualitative and descriptive studies have identified the main impacts of resettlement in Lao PDR: severely reduced agricultural yields, compromised food security, increased morbidity and mortality from malaria and other infectious diseases, and widespread livestock disease (Baird & Shoemaker, 2005). Paradoxically, the resettlement policies appear to have increased mobility and internal migration as displaced villagers return to upland territories to continue swidden agriculture (Evrard & Goudineau, 2004). No studies to date have looked specifically at the long-term implications of resettlement for children's well-being in this population. If resettlement causes food insecurity and increased morbidity, then we would expect children in resettled households to achieve shorter heights than children in non-mover households. Resettlement may also affect educational attainment in several ways. If resettlement does compromise linear growth, then resettled children may experience delayed enrollment if parents perceive the child as too young or too small to start school. Reduced income due to resettlement may prevent parents from paying school fees or may require children to work on family lands rather than attend school. Increased morbidity and cognitive impairments from poor diets may also affect progression through school.

METHODS

Our goal is to test whether resettlement compromises children's human capital, as measured by nutritional status and educational attainment. We use three nutrition measures. Height-for-age z-score (HAZ) indicates a child's height relative to a well-nourished standard population of the same age and sex. HAZ is a commonly-used measure of long-term child health and past nutritional investments, and has been linked to health and productivity in later life (Thomas, 2001). Hemoglobin concentration is a key indicator of iron-deficiency anemia, the most common micronutrient deficiency worldwide. Iron deficiency is strongly associated with poor health and cognitive outcomes in children (WHO/UNICEF/UNU, 2001). The third nutritional measure we use is the child's diet diversity score, ranging from 1-8 depending on the number of food groups consumed by the child in the past 24 hours. The scale is considered a good proxy for the nutritional quality of a child's diet (Swindale & Bilinsky, 2005).

We employ several measures of educational attainment as well. The northern rural districts of Lao PDR have low levels of school enrollment and attendance. Many villages have no school; many others have only an "incomplete" primary school with two or three grades taught. Progression rates from Grade 1 to Grade 2 are also low, with children often repeating Grade 1 multiple times. Our education indicators include a dichotomous measure of current enrollment; a categorical variable indicating the child's highest achieved grade level (no formal schooling, Grade 1, or Grade 2 or higher); and a linear measure of education "gap," measured as the difference between the child's age and the age of a child of the same education level who had experienced no delays in enrollment or progression. For example, children are supposed to enroll in Grade 1 at age six. Therefore, a nine-year-old in our sample who was currently or most recently enrolled in Grade 1 would have a calculated education gap of three years.

To evaluate the impact of resettlement on children's health and educational outcomes, we must account for the fact that resettlement is not randomly distributed in the population. Because resettled villages in northern Laos tend to be the most remote and underdeveloped, it is likely that the children in households that are resettled already exhibit poorer nutritional status and educational attainment than children from households that were not resettled. We account for this unobserved heterogeneity in two ways. First we employ a village fixed-effects estimator in regressions predicting human capital outcomes as a function of resettlement. The village fixed-effects estimator sweeps out of the model any observed or unobserved characteristics of villages that might be associated with both resettlement and with children's human capital. The estimator is equivalent to adding a dummy variable for each village in the sample. One significant drawback to this approach is that resettled households are by definition interviewed in their new (destination) village, while the unobserved characteristics we hope to control are likely associated with their village of origin. We present preliminary results from these models for nutritional outcomes only below.

A second approach we plan to pursue is propensity score matching (PSM). PSM addresses selection bias by matching individuals from different subgroups based on a large number of observed characteristics, generating a quasi-experimental sample (Dehejia & Wahba, 1998; Diaz & Handa, Forthcoming; Heckman, Ichimura, & Todd, 1997; Rubin & Thomas, 2000). The PSM estimator creates a propensity score (in our case, the propensity for being resettled) and matches each treated (resettled) case to one or more control (not resettled) cases based on this score. Once cases are matched, the effect of the treatment on the outcomes of interest can be estimated.

DATA

The data for this study are taken from a baseline survey for the evaluation of a World Food Programme school feeding initiative in Northern Lao PDR conducted by the World Bank. The sample includes 4,169 households with at least one child ages 6-10 years. The sample is representative of rural households with school-aged children in three districts of Phongsaly Province and one district of Luang Prabang Province. These districts are remote and mountainous, with many villages accessible only by boat or by a several-day walk from a road. The region is ethnically very diverse, with over 50 distinct ethnic groups. For the reasons discussed above, resettlement has been a common phenomenon in the study population.

Child-level data in the survey include detailed schooling histories, time use, and diet diversity. In addition, trained anthropometrists collected height, weight, and hemoglobin measures. Household survey modules included basic migration histories, assets, income,

livestock and agriculture, household food security and diet diversity, shocks, and social capital. Village heads and school teachers were also interviewed. Fieldwork was conducted from February-April 2006 under the supervision of the Lao National Statistics Centre and Opifer International. Data entry was completed in September 2006 by the Lao National Statistics Centre. For this analysis we use a sample of 5,261 children ages 6-10 from 3,664 households. Descriptive statistics for this sample are provided in Table 1.

PRELIMINARY RESULTS

Descriptive statistics shown in Table 1 confirm that resettlement is associated both with poorer nutritional outcomes and lower educational attainment. In the first columns we show statistics for children from all households. The second two columns show statistics for children from resettled households only. HAZ scores and all the educational attainment indicators are worse for this group. Hemoglobin and diet diversity, two current measures of diet quality, do not appear to be worse. For comparison, we show statistics in the fifth and sixth columns for another group of relocated children – those whose households relocated in the last ten years for reasons other than forced resettlement, such as forming a new household or moving for employment. This group does not demonstrate worse nutritional or educational outcomes.

Do these relationships hold in multivariate analyses? Table 2 reports coefficients from a set of village fixed-effects models predicting HAZ, hemoglobin, and diet diversity as a function of resettlement, other relocation, and a set of other individual and household controls. As discussed above, the village fixed-effects models at least partially address the potential bias in cross-sectional models from unobserved heterogeneity in the likelihood of being displaced. Each set of models includes two specifications: the first looks only at resettlement as a predictor of nutritional status, and the second includes the household's food security measures as a mediator. This second specification tests the hypothesis that resettlement's effect on child nutritional status operates through household food security. The models also include controls for the education level of adults in the household, whether the child's father and/or mother is absent, and the age-sex composition of the household.

Results from models (1) and (2) suggest that resettlement does permanently affect attained height, decreasing the HAZ-score by .14 standard deviations. The effect is not attenuated by the addition of the household food insecurity measure. As suggested by the descriptive statistics, resettlement is not associated with poorer hemoglobin or child diet diversity scores. In all three sets of models, household food insecurity, as measured by the number of months of insufficient rice in the past year, is independently and negatively associated with nutritional outcomes.

FUTURE WORK

Results presented here are based on very preliminary data analysis. Several extensions and refinements of this analysis are planned. First, we will incorporate detailed household and community characteristics into the propensity scores for the matching techniques described above. Second, we will extend the analysis to educational outcomes. Third, we plan to link nutritional outcomes and educational attainment by testing whether poor nutritional outcomes (related to resettlement) cause delayed school enrollment and poor progress in school. Fourth, we will conduct separate village-level analyses of the socioeconomic implications of displacement based on village head reports. Longitudinal analysis at the child, household and village levels will be possible when the second round of the survey is fielded in Spring 2008.

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Table 1. Descriptive statistics, children ages 6-10, rural Phongsaly and Luang Prabang districts, Lao PDR, 2006 [N=5261].

	All children		Resettled households		Other relocated households		Non-mover households	
Variables	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev	Mean	Std. Dev.
Individual Characteristics								
Age in Years	7.94	1.43	7.92	1.48	7.82	1.43	7.96	1.42
Male = 1	0.51	0.50	0.51	0.50	0.54	0.50	0.51	0.50
Height-for-age z-score	-2.29	1.22	-2.54	1.21	-2.22	1.10	-2.26	1.22
Hemolgobin (g/dL)	12.32	1.30	12.37	1.32	12.29	1.31	12.32	1.30
Diet diversity	3.82	1.24	3.81	1.07	3.95	1.31	3.81	1.26
Currently enrolled in school	0.67	0.47	0.58	0.49	0.74	0.44	0.68	0.47
Completed education (years)	1.09	1.05	0.87	0.94	1.17	1.02	1.12	1.06
Current or most recent grade in school								
Never enrolled	0.32	0.47	0.40	0.49	0.26	0.44	0.31	0.46
Grade 1	0.41	0.49	0.42	0.49	0.46	0.50	0.41	0.49
Grade 2 or above	0.27	0.44	0.18	0.39	0.29	0.45	0.28	0.45
Education gap (years behind normal progress)	1.54	1.30	1.66	1.40	1.41	1.26	1.53	1.29
Mother absent	0.02	0.15	0.02	0.13	0.02	0.13	0.02	0.15
Father absent	0.05	0.22	0.03	0.17	0.05	0.22	0.05	0.22
Household Variables								
Resettled in last 10 years	0.14	0.35	---	---	---	---	---	---
Relocated for other reasons, last 10 years	0.07	0.26	---	---	---	---	---	---
Ethnic group								
Lao-Tai	0.17	0.38	0.04	0.19	0.19	0.40	0.20	0.40
Mon-Khmer	0.31	0.46	0.32	0.47	0.40	0.49	0.31	0.46
Sino-Tibetan	0.41	0.49	0.47	0.50	0.33	0.47	0.41	0.49
Hmong-Iumien	0.10	0.30	0.18	0.39	0.08	0.26	0.08	0.28
No. of adults in household with 3+ years of education	0.93	1.14	0.70	1.05	0.92	1.05	0.98	1.16
Months of insufficient rice in last year	1.70	2.47	1.91	2.44	1.97	2.80	1.63	2.44
N	5261		746		371		4144	

Table 2. Correlates of health outcomes for children ages 6-10 from village fixed-effects linear regression models, rural Phongsaly and Luang Prabang districts, Lao PDR, 2006 [N=5261].

	Height-for-age z-score		Hemoglobin (g/dL)		Diet Diversity Score	
	(1)	(2)	(3)	(4)	(5)	(6)
Resettled in last 10 years	-0.144	-0.143	-0.088	-0.088	-0.094	-0.093
	[1.97]*	[1.97]*	[1.17]	[1.16]	[1.40]	[1.39]
Relocated for other reason, last 10 years	-0.020	-0.021	-0.052	-0.053	0.108	0.107
	[0.29]	[0.31]	[0.74]	[0.76]	[1.74]	[1.73]
Months of insufficient rice in last year		-0.021		-0.029		-0.026
		[2.78]**		[3.62]**		[3.75]**
Age	-0.405	-0.405	0.330	0.331	-0.082	-0.081
	[2.68]**	[2.69]**	[2.11]*	[2.11]*	[0.59]	[0.59]
Age Squared	0.023	0.023	-0.015	-0.015	0.006	0.006
	[2.39]*	[2.39]*	[1.55]	[1.55]	[0.68]	[0.68]
Male = 1	-0.07	-0.072	-0.145	-0.147	-0.058	-0.059
	[1.78]	[1.82]	[3.56]**	[3.60]**	[1.59]	[1.64]
Ethnic Group (Ref = Lao-Tai)						
Mon-Khmer	-0.217	-0.197	0.144	0.172	-0.143	-0.117
	[1.91]	[1.73]	[1.22]	[1.45]	[1.36]	[1.12]
Sino-Tibetan	-0.234	-0.212	0.124	0.153	-0.384	-0.357
	[1.29]	[1.17]	[0.66]	[0.81]	[2.30]*	[2.14]*
Hmong-Iumien	-0.394	-0.374	0.648	0.675	-0.131	-0.107
	[1.79]	[1.70]	[2.83]**	[2.95]**	[0.65]	[0.53]
Constant	-0.295	-0.272	10.594	10.625	4.108	4.136
	[0.50]	[0.46]	[17.10]**	[17.17]**	[7.49]**	[7.56]**
Observations	5261	5261	5261	5261	5261	5261
Number of Villages	262	262	262	262	262	262
R-squared	0.01	0.01	0.02	0.02	0.02	0.02

Absolute value of t statistics in brackets

* significant at 5%; ** significant at 1%

Notes: The sample is self-weighting at the district level but is not yet adjusted for nonresponse at the village or household level. Other reported reasons for relocating include leaving parents' home, other family reasons, employment, and problem in village. Diet diversity score ranges from 1-9 and reflects the number of different food groups consumed by the child during the previous day as reported by the child's mother or other informed adult household member. Models also control for education level of adults in household, absence of child's mother and father, and age-sex composition of household. All models include village fixed effects.