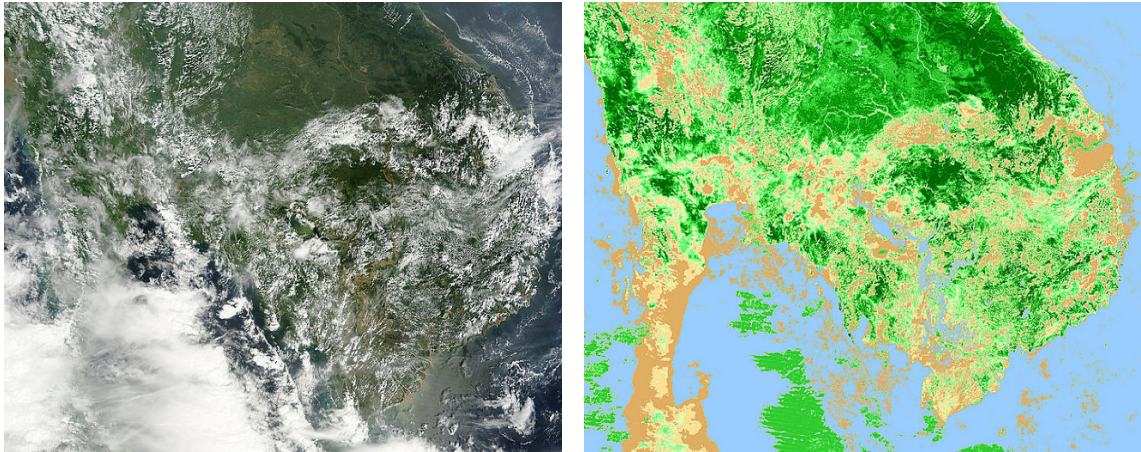


Internal Labor Migration as a Shock Coping  
Strategy: Evidence from a Typhoon

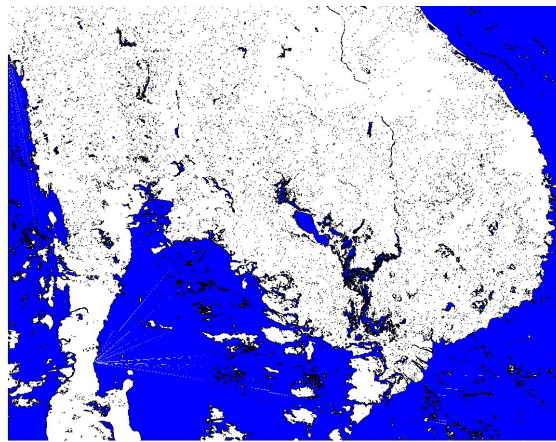
André Gröger and Yanos Zylberberg

Online Appendix



(a) Raw

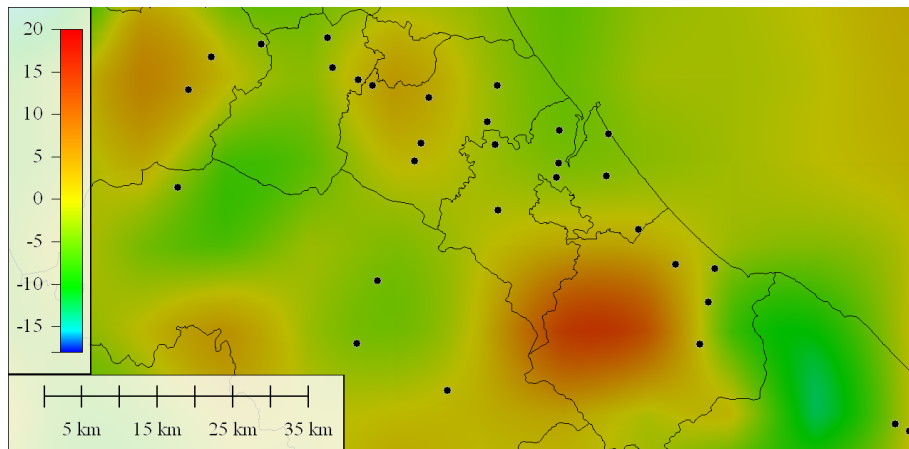
(b) NDVI band visualization



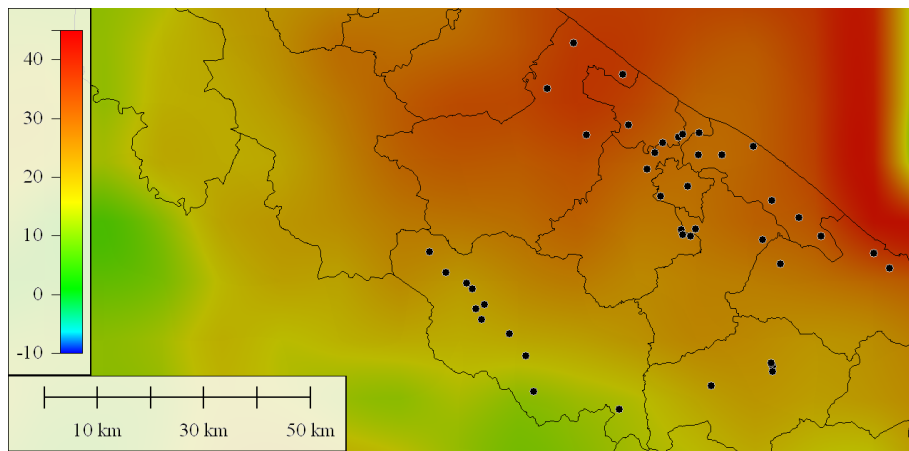
(c) Surface water

**Figure A.1.** Modification steps of MODIS satellite imagery

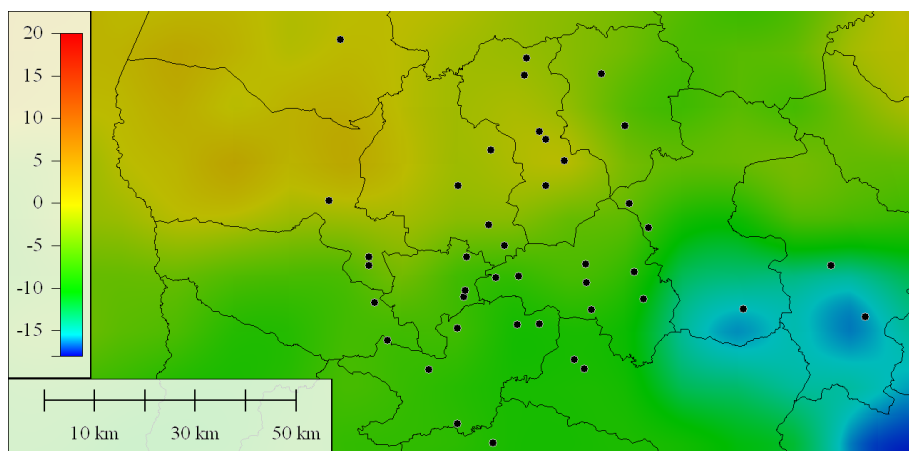
*Source:* MODIS subset Indochina (6/10/2009).



(a) Ha Tinh province



(b) Hue province



(c) Dak Lak province

**Figure A.2.** Rainfall intensity during the passing of Typhoon Ketsana

*Note:* Excess rainfall estimates (measured in centimeters) in survey provinces on the 29th and 30th of September 2009 compared to 26th and 27th of September and 1st to 5th of October.  
*Source:* Authors' calculations based on NOAA RFE 2.0 data.

**Table A.1.** Pre-treatment trends

VARIABLES	(1)	(2)
Total income	317.93 (313.88)	326.18 (315.81)
Total consumption	218.99 (181.14)	219.28 (182.56)
Local labor migrant incidence (same district)	-0.05 (0.03)	-0.05 (0.03)
Local labor migrant remittances (same district)	13.81 (16.41)	13.95 (16.56)
Long-distance labor migrant incidence (different district)	-0.05 (0.09)	-0.05 (0.08)
Long-distance labor migrant remittances (different district)	-46.70 (35.69)	-50.57 (37.81)
Long-distance labor migrant incidence (different province)	-0.03 (0.08)	-0.03 (0.07)
Long-distance labor migrant remittances (different province)	-24.031 (30.96)	-21.81 (32.49)
Observations	4,152	4,152
Sample	All	All
Controls (household characteristics)	Yes	Yes
Household fixed effects	No	Yes

*Note:* Each cell displays the result of a separate regression (specification (1) with the waves 2007 and 2008 instead of 2008 and 2010). We only report the Difference-in-Difference coefficient, i.e. the coefficient before the treatment interacted with a dummy for the wave 2008. Robust standard errors in parentheses are clustered at the commune level. \*\*\*:  $p < 0.01$ , \*\*:  $p < 0.05$ , \*:  $p < 0.1$ . All variables are expressed in USD (PPP) per capita, i.e adjusted by the number of permanent household members excluding migrants.

*Source:* Authors' calculations based on "Vulnerability to Poverty in Southeast Asia" panel data.

Table A.2. Balance test

	Coefficient	Standard Error	P-value	Observations
Total income	779.33	244.43	0.002	2,115
<i>Crop</i>	731.30	212.10	0.001	2,115
<i>Self-employment</i>	146.49	112.95	0.197	2,114
<i>Wage</i>	16.63	80.81	0.837	2,115
<i>Subsidies</i>	3.40	86.12	0.969	2,115
		<i>Consumption</i>		
Total consumption	366.38	238.85	0.128	2,098
<i>Food</i>	258.92	101.64	0.012	2,098
<i>Non-food</i>	55.25	132.86	0.678	2,098
<i>Education</i>	-17.97	41.10	0.663	2,098
<i>Health</i>	49.93	30.91	0.109	2,098
		<i>Labor migration</i>		
<i>Incidence</i>				
Local (same district)	-0.05	0.03	0.094	2,098
Long-distance (different district)	0.20	0.12	0.088	2,094
Long-distance (different province)	0.22	0.11	0.044	2,094
<i>Remittances</i>				
Local (same district)	-3.94	2.34	0.095	2,096
Long-distance (different district)	-7.43	37.16	0.842	2,094
Long-distance (different province)	6.82	25.27	0.788	2,094
		<i>Other smoothing instruments</i>		
Transfers from family & friends	13.25	63.73	0.836	2,114
Savings	-17.95	72.96	0.806	2,115
Borrowing	51.64	403.05	0.898	2,115
		<i>Long-distance labor migrants' characteristics (different district)</i>		
Income	18.60	39.55	0.639	450
Age	0.83	2.63	0.752	450
Male	-0.07	0.16	0.658	450
Education	0.08	0.18	0.652	413

*Note:* Correlation between observables and the treatment in 2008. Each line is the result of a separate regression (specification 4). Only the coefficient before the treatment variable is reported. Income, expenditures, and transfers are expressed in USD (PPP) per capita, i.e. adjusted by the number of permanent household members excluding migrants. Transfers from family & friends includes all other informal transfers received from the extended family network and friends.

*Source:* Authors' calculations based on "Vulnerability to Poverty in Southeast Asia" panel data.

**Table A.3.** Income losses and remittances using the rainfall treatment

Specification	OLS	IV (second stage)
VARIABLES	Rainfall treatment	Flood treatment
Total income	-23.13** (10.88)	-2587.23** (1100.46)
Local labor migrant remittances (same district)	-0.39 (0.55)	9.28 (59.10)
Long-distance labor migrant remittances (different district)	3.66** (1.62)	370.21** (151.53)
Long-distance labor migrant remittances (different province)	2.71* (1.44)	238.76* (124.94)
Observations	4,221	4,221
Sample	All	All
Province $\times$ Wave fixed effects	Yes	Yes
Controls (household characteristics)	Yes	Yes
Household fixed effects	Yes	Yes
Specification		IV (first stage)
VARIABLES		Rainfall treatment
Flood treatment		0.00859*** (0.00067)
Cragg-Donald F statistic		162.28
Observations		4,221
Sample		All
Province $\times$ Wave fixed effects		Yes
Controls (household characteristics)		Yes
Household fixed effects		Yes

*Note:* Each cell displays the result of a separate regression. In the first column, we use specification (1) with the rainfall treatment and we only report the Difference-in-Difference coefficient, i.e. the coefficient before the treatment interacted with a dummy for the wave 2010. In the second column, we estimate a two-stage specification in which the flood treatment is first explained by the rainfall treatment (first stage). We control for the average rainfall in the period 26/09-10/10 in 2007 and 2008 separately. Robust standard errors in parentheses are clustered at the commune level. \*\*\*:  $p < 0.01$ , \*\*:  $p < 0.05$ , \*:  $p < 0.1$ . All variables are expressed in USD (PPP) per capita, i.e. adjusted by the number of permanent household members excluding migrants.

*Source:* Authors' calculations based on "Vulnerability to Poverty in Southeast Asia" panel data.

**Table A.4.** Income losses and remittances including additional control variables

VARIABLES	(1)	(2)	(3)	(4)
Income	-766.06*** (285.90)	-695.28** (273.95)	-451.41* (264.90)	
Local labor migrant remittances (same district)	1.74 (7.34)	-10.04 (9.59)	-6.25 (11.44)	-8.89 (9.72)
Long-distance labor migrant remittances (different district)	138.90** (45.72)	128.02*** (44.40)	129.49*** (46.09)	128.10*** (42.30)
Long-distance labor migrant remittances (different province)	89.57** (38.15)	80.79** (36.24)	67.25* (37.85)	80.72** (34.26)
Observations	4,241	4,241	4,221	4,244
Sample	All	All	All	All
Province $\times$ Wave fixed effects	Yes	Yes	Yes	Yes
Controls (household characteristics)	Yes	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes	Yes
Controls (village topography)	Yes	No	No	No
Controls (historical exposure to typhoons)	No	Yes	No	No
Controls (average rainfall and volatility)	No	No	Yes	No
Definition migrants	180 days	180 days	180 days	90 days

*Note:* Each cell displays the result of a separate regression (specification (1) with fixed effects). We only report the Difference-in-Difference coefficient, i.e. the coefficient before the treatment interacted with a dummy for the wave 2010. In (S1), we control for the village topography (mountains, coasts, slope, valley, and rivers) interacted with the wave. In (S2), we control for long-term propensity to be affected by typhoons interacted with the wave (i.e. the average annual percentage of a district area at most 50kms from the passing of a tropical typhoon between 1945 and 2006). In (S3), we control for the historical average rainfall and volatility in the period 26/09-10/10 between 2001 and 2008. In (S4), we define migrants as members having been away for more than 90 days instead of 180 days. Robust standard errors in parentheses are clustered at the commune level. \*\*\*:  $p < 0.01$ , \*\*:  $p < 0.05$ , \*:  $p < 0.1$ . All variables are expressed in USD (PPP) per capita, i.e. adjusted by the number of permanent household members excluding migrants.  
*Source:* Authors' calculations based on "Vulnerability to Poverty in Southeast Asia" panel data.

**Table A.5.** Consumption and remittances in logarithmic and normalized specification

VARIABLES	(1)	(2)	(3)
Total income (logarithm)	-0.868** (0.398)	-0.760** (0.383)	-0.865** (0.380)
Local labor migrant remittances (same district, fraction of income)	-0.006 (0.011)	-0.006 (0.011)	-0.004 (0.012)
Long-distance labor migrant remittances (different district, fraction of income)	0.132*** (0.047)	0.132*** (0.048)	0.135*** (0.047)
Long-distance labor migrant remittances (different province, fraction of income)	0.113*** (0.043)	0.113*** (0.043)	0.116*** (0.043)
Observations	4,255	4,196	4,255
Sample	All	No attrition	All
Controls	Yes	Yes	Yes
Province $\times$ Wave fixed effects	Yes	Yes	Yes
Household fixed effects	No	No	Yes

*Note:* Each cell displays the result of a separate regression (specification (1)). We only report the Difference-in-Difference coefficient, i.e. the coefficient before the treatment interacted with a dummy for the wave 2010. Robust standard errors in parentheses are clustered at the commune level. \*\*\*:  $p < 0.01$ , \*\*:  $p < 0.05$ , \*:  $p < 0.1$ . In the first line, we consider the logarithm of the variable expressed in USD (PPP) per capita, i.e. adjusted by the number of permanent household members excluding migrants. In lines 2-4, labor migrant remittances are expressed per unit of household income, i.e. income from domestic sources including government transfers net of any informal transfers, i.e. excluding remittances.

*Source:* Authors' calculations based on "Vulnerability to Poverty in Southeast Asia" panel data.

**Table A.6.** Income losses by households' migration status

	Total income (1)	Crop income (2)
Treatment	-602.18** (286.73)	-448.38** (181.93)
Treatment $\times$ Long-distance labor migrant (different district)	-325.43 (382.87)	26.35 (201.97)
Observations	4,177	4,177
Sample	All	All
Controls (household characteristics)	Yes	Yes
Province $\times$ Wave fixed effects	Yes	Yes
Household fixed effects	Yes	Yes

*Note:* Robust standard errors in parentheses are clustered at the commune level. We only report the Difference-in-Difference coefficient, i.e. the coefficient before the treatment interacted with a dummy for the wave 2010. \*\*\*:  $p < 0.01$ , \*\*:  $p < 0.05$ , \*:  $p < 0.1$ . All income variables are expressed in USD (PPP) per capita, i.e. adjusted by the number of permanent household members excluding migrants.

*Source:* Authors' calculations based on "Vulnerability to Poverty in Southeast Asia" panel data.

