

Internal migration as a risk-coping strategy: evidence from a typhoon.

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Presented at the KNOMAD International Conference on
Internal Migration and Urbanization
held in Dhaka on April 30-May 1, 2014

To which extent does *internal migration* help alleviate big shocks?



After a shock,

1. Do households receive remittances?
2. Is it sufficient? How does it compare with other risk-coping mechanisms?
3. Is the migration decision taken *ex-ante* or *ex-post*?

In 2009, typhoon Ondoy struck Vietnam: heavy floodings.



In this paper,

- ▶ we reconstruct the flooded areas thanks to **satellite images**,
- ▶ match them with a **panel** of rural households (2008-2010) in Ha Tinh, Thua Thien Hue, and Dak Lak,
- ▶ analyze how **internal migration** help rural households in the recovery.

Related literature

Remittances: Yang (2008), Yang and Choi (2007) (Philippines, foreign remittances: 60-80% of initial shocks)

Informal transfers: Townsend (1994), Fafchamps and Lund (2003), Fafchamps and Guber (2007)

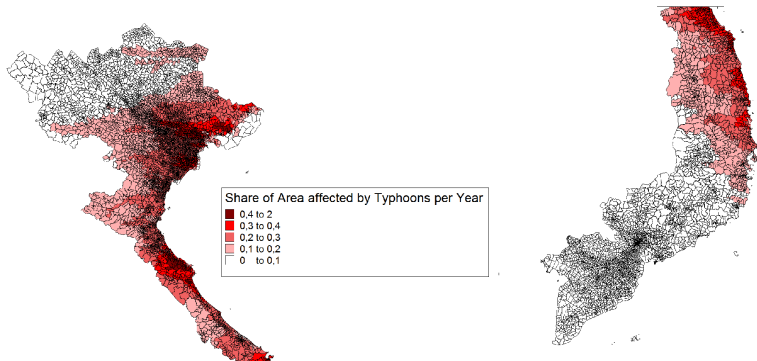
Other risk-coping: Savings (Paxson 1992), Labor (Kochar 1999)

Risk management: Sandmo (1971), Rosenzweig and Binswanger (1993)

Internal migration: Gibson et al (2011), Gubert (2002), De Werdt and Hirvonen (2013), Giles (2006), Morten (2013)

Context

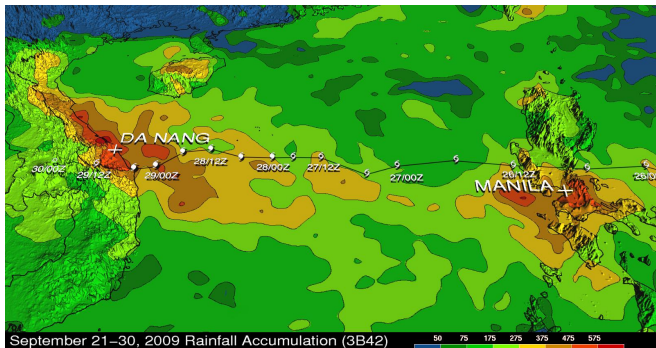
Typhoon risk



Source: 1945-2011 Joint Typhoon Warning Center (US Navy)

Ondoy/Ketsana (2009)

- ▶ 2,5 Million affected people
- ▶ \$785 Million in direct damages in Vietnam (EM-DAT), 1% of GDP
- ▶ indirect damages estimated to be 4% of household income



Source: Nasa/TRMM

Risk-coping mechanisms

In rural areas, little diversification:

- ▶ mostly **rice growers** (a bit of coffee): 40-50% crop income.
- ▶ some wage employment (800\$) and other businesses (900\$) versus 2300\$ for crops.

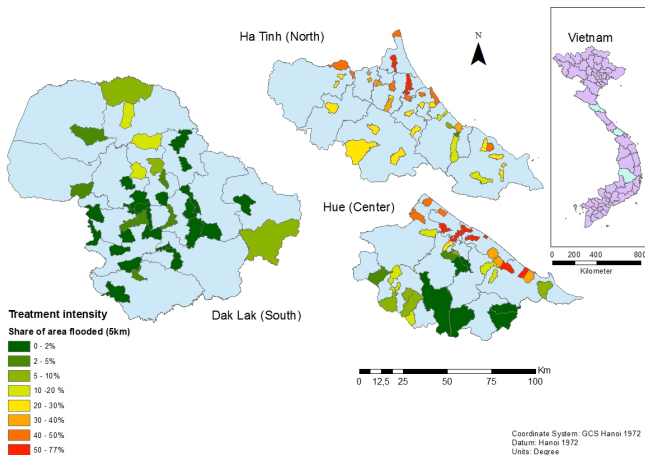
Few risk-coping instruments:

- ▶ Savings, financial institutions.
- ▶ NGOs, insurance, natural disasters funds.
- ▶ Informal transfers.

Data

Treatment across regions

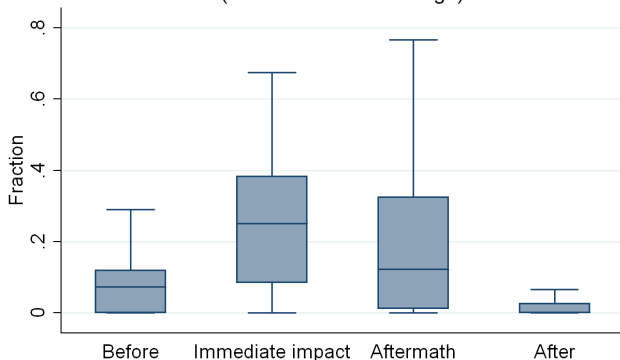
Construction: area inundated during different reference periods within different radii around the village ($r=1, 2, 5, 10$ kms).



Continuous treatment indicator at village-level (positively and significantly correlated with typhoon shock self-reports).

Treatment across time

Share of flooded area over time
(5kms around the village)



Source: Authors' calculations (MODIS)

Household data

DFG Vulnerability in Southeast Asia:

- ▶ Panel of 2.200 rural households in Vietnam (2007, 2008, 2010, 2013)
- ▶ 3 provinces: Ha Tinh, Hue, and Dak Lak.
- ▶ 220 villages with 10 households each.

Descriptive statistics

	Obs.	Mean
<i>Household Demographics</i>		
Household Size	2,100	4.39
No. Men (16-59)	2,100	1.2
Dependency ratio	2,100	.38
<i>Household Head</i>		
Main occupation: farmer	2,100	.66
Age	2,100	49.1
Years of schooling	2,032	6.7
Female	2,100	.16
<i>Household Wealth</i>		
Domestic income (USD)	2,073	5,121
<i>Migration</i>		
Total remittances (USD)	2,099	526
from absent hh members (USD)	2,099	344
from relatives and friends (USD)	2,099	182
Prob.(Migrant)	2,100	.38
No. Migrants	2,100	.61

Source: Panel - 2008

Estimation strategy

$$Y_{h,v,p,t} = \beta_0 + \beta_1 T_{v,t} + \beta_2 P_v + \gamma X_{h,t} + \delta_{p,t} + \alpha_h + \varepsilon_{h,v,p,t} \quad (\text{T})$$

with:

- ▶ $y_{h,t}$: income per capita, remittances...
- ▶ T_v is the **treatment**: share of area flooded in the aftermath.
- ▶ P_v : share of area flooded in normal times.
- ▶ $\mu_{p,t}$: province/wave FE, α_h household FE
- ▶ $X_{h,t}$: head (age, gender, education), household size, working members.

SE clustered at village level.

Results

Does our treatment affect income?

Income losses

Table: Income losses due to the treatment.

	Income p.c.	Crop income p.c.				
	(1)	All (2)	Summer (3)	SA paddy (4)	Winter (5)	W paddy (6)
Treatment	-524.75*	-265.60**	-102.50**	-71.29**	47.45	12.11
$T_{v,2010}$	(293.60)	(136.45)	(52.69)	(31.79)	(79.76)	(58.23)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,788	3,882	3,922	3,925	3,925	3,925

Robust standard errors in parentheses, clustered at the village level. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. All monetary values are expressed in USD (PPP).

I: Do remittances respond to the shock?

Remittances

Table: Transfers from labor migrants in response to the treatment.

	Labor migrant transfers p.c.		
	local (same dis.) (1)	long-distance (diff. dis.) (2)	long-distance (diff. pro.) (3)
Treatment	-42.67**	174.70***	107.09**
$T_{v,2010}$	(18.36)	(56.80)	(44.69)
Controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Observations	3,926	3,926	3,926

Robust standard errors in parentheses, clustered at the village level. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. All monetary values are expressed in USD (PPP).

II: Sufficient? How does it compare with other mechanisms?

Sufficient?

Table: Consumption and household expenditures in response to the shock.

	Consumption p.c.				
	Total (1)	Food (2)	Non-food (3)	Health (4)	Education (5)
Treatment	-204.82	-173.63*	48.85	-27.53	-19.61
$T_{v,2010}$	(175.52)	(100.06)	(31.97)	(41.81)	(49.36)
Controls	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	3,926	3,926	3,926	3,926	3,926

Robust standard errors in parentheses, clustered at the village level. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. All monetary values are expressed in USD (PPP).

► Others

Sufficient?

Per capita, in the most affected village,

- ▶ total income per capita decreases by **\$400**, crop income by **\$200**
- ▶ households receive **\$140** per capita from labor migrants (long distance)
- ▶ consumption still decrease: total **-\$160**, mostly driven by food **-\$130**

III: From established migrants?

With established migrants

Table: Transfers from labor migrants in response to the treatment – subsamples of established migrants.

	Labor migrant transfers p.c.		
	local (same district) (1)	long-distance (dis.) (2)	long-distance (pro.) (3)
Treatment	-362.52	400.49***	227.38*
$T_{v,2010}$	(302.21)	(138.24)	(123.50)
Controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Observations	182	836	731

Robust standard errors in parentheses, clustered at the village level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All monetary values are expressed in USD (PPP).

Without established migrants

Table: Transfers from labor migrants in response to the treatment – subsamples without established migrants.

	Labor migrant transfers p.c.			
	Local (same dis.)		Long-distance (diff. dis.)	
	Presence (1)	Amount p.c. (2)	Presence (3)	Amount p.c. (4)
Treatment	-0.104*	-29.12*	0.167*	78.51**
$T_{v,2010}$	(0.055)	(15.74)	(0.095)	(36.33)
Sample	<i>No local migrants</i>		<i>No long-distance migrants</i>	
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Observations	3,744	3,744	3,099	3,099

Robust standard errors in parentheses, clustered at the village level. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. All monetary values are expressed in USD (PPP).

► Full Sample

Interpretation and open questions

Interpretation and open questions

Migrants that are send “purposedly” are as “efficient” in terms of transfers as the others.

- ▶ are they also efficient in terms of income?
- ▶ does it change the long-term migration patterns?
- ▶ what can we learn about the migration decision?

Conclusion

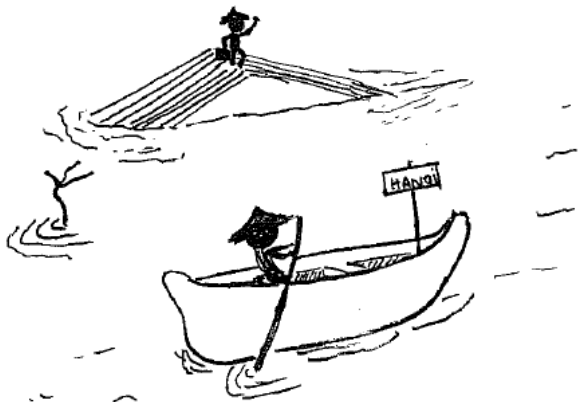
Summary

- ▶ Ondoy triggered significant negative impacts
- ▶ households are unable to cope with these losses except through transfers from labor migrants
- ▶ while local support networks break down, long-distance networks remain effective
- ▶ affected households without ex-ante labor migrants are more likely to send out new members
- ▶ established and newly-sent labor migrants behave similarly in terms of transfers
- ▶ however, a relatively **large part of uninsured risk remains**

Policy implications

- ▶ strong case for the implementation of functioning public insurance solutions
- ▶ further liberalization of internal migration policy in Vietnam
- ▶ implications for disaster relief efforts and labor allocation strategies

Thanks

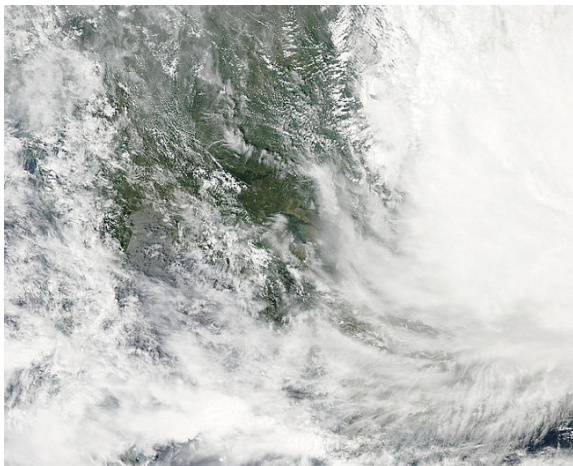


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Appendix

Satellite data

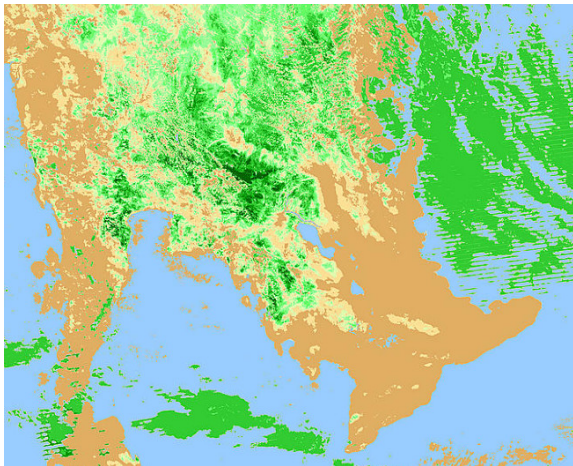
Detecting temporal changes in the extent of annual flooding within the Cambodia and the Vietnamese Mekong Delta from MODIS time-series imagery (Sakamoto et al, 2007)



30/09

Satellite data

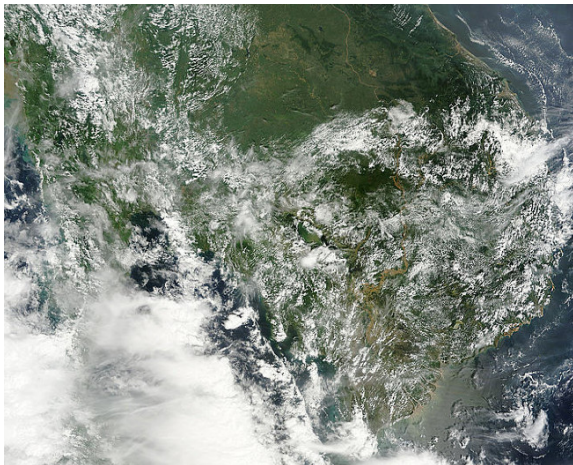
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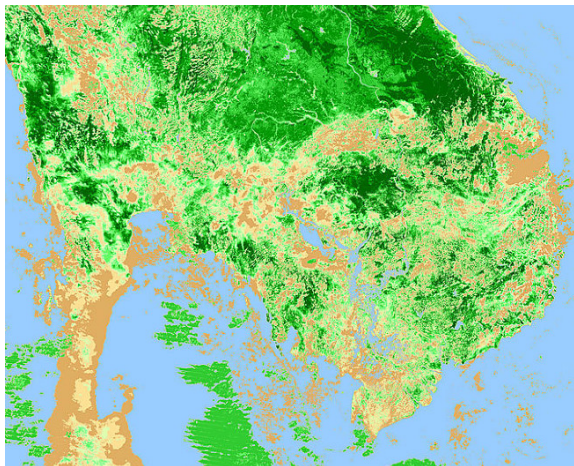
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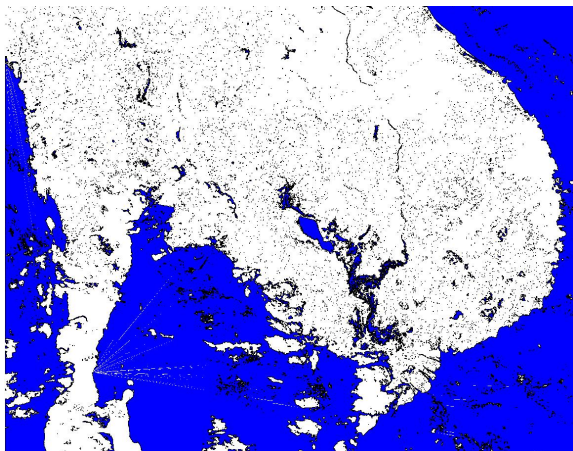
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Satellite data

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06/10

Mean Comparison

Table: Treated versus control districts in 2008.

	Treated [696]	Control [1,304]	Difference	
			Value D	$P(D > 0)$
<i>Household Income</i>				
Income per cap.	1403.82	1312.10	91.72	[0.250]
<i>Crop</i>	496.05	453.47	42.58	[0.260]
<i>Crop (Summer)</i>	101.50	89.23	12.27	[0.234]
<i>Wage</i>	189.51	205.83	-16.32	[0.510]
<i>Subsidies</i>	128.86	124.18	4.68	[0.785]
<i>Consumption</i>				
Consumption per cap.	1302.7	1223.4	79.32	[0.073]
<i>Food</i>	663.75	610.45	53.29	[0.007]
<i>Non-food</i>	244.41	248.52	-4.11	[0.797]
<i>Health</i>	60.71	44.40	16.30	[0.017]
<i>Education</i>	71.51	70.84	0.67	[0.930]
<i>Remittances</i>				
Remittances per cap.	20.71	31.81	-11.10	[0.637]
<i>labor migrants (same district)</i>	2.67	1.43	1.24	[0.560]
<i>labor migrants (other district)</i>	22.37	15.18	7.18	[0.347]
<i>labor migrants (other province)</i>	20.82	13.41	7.40	[0.231]
<i>Other smoothing instruments</i>				
Transfers from friends per cap.	44.14	33.09	11.04	[0.337]
Savings per cap.	65.68	59.29	6.38	[0.458]
Borrowing per cap.	558.78	567.42	-8.64	[0.489]

Source: Panel - 2008. All variables are expressed in USD and per capita, i.e., adjusted by the number of household members.

Table: Transfers from other third parties (non-labor migrants, friends, public redistribution, insurance).

	Transfers p.c.			
	Non-labor migrants (1)	Family & Friends (2)	Public (3)	Insurance (4)
Treatment $T_{v,2010}$	-134.69 (92.62)	52.66 (95.35)	-98.18 (60.52)	6.37 (12.88)
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Observations	3,926	3,919	3,924	3,925

Robust standard errors in parentheses, clustered at the village level. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. All monetary values are expressed in USD (PPP).

Table: Borrowing and dissaving in response to the shock.

	Borrowing p.c.		Dissaving p.c.	
	Formal (1)	Informal (2)	Liquid assets (3)	Tangible assets (4)
Treatment	-266.35	-38.49	217.65	69.54
$T_{v,2010}$	(214.09)	(153.81)	(138.36)	(237.07)
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Observations	3,926	3,926	3,921	3,920

Robust standard errors in parentheses, clustered at the village level. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. All monetary values are expressed in USD (PPP).