

# ANNUAL BIDS CONFERENCE ON DEVELOPMENT (ABCD)

**RISK, POVERTY OR POLITICS? THE DETERMINANTS OF SUBNATIONAL  
PUBLIC SPENDING ALLOCATION FOR ADAPTIVE DISASTER RISK REDUCTION  
IN BANGLADESH**



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# Outline



- Research Question
- Conceptual Framework
- Descriptive Statistics
- DRR Spending Distribution
- Methodological Framework
- Estimation Results
- Robustness Checks
- Conclusion and Policy Remarks

# The Question we ask



- *What determines subnational public spending for disaster risk reduction and adaptation in Bangladesh?*
- We aim to investigate whether the flows of DRR funding are conditional upon primary determinants i.e. exposure to local hazards, local vulnerabilities, and other local attributes such as the proximity of political affiliation between the sub-district and the center.

# Social Protection, Disaster Risk Reduction and Climate Change Adaptation: A Conceptual Framework

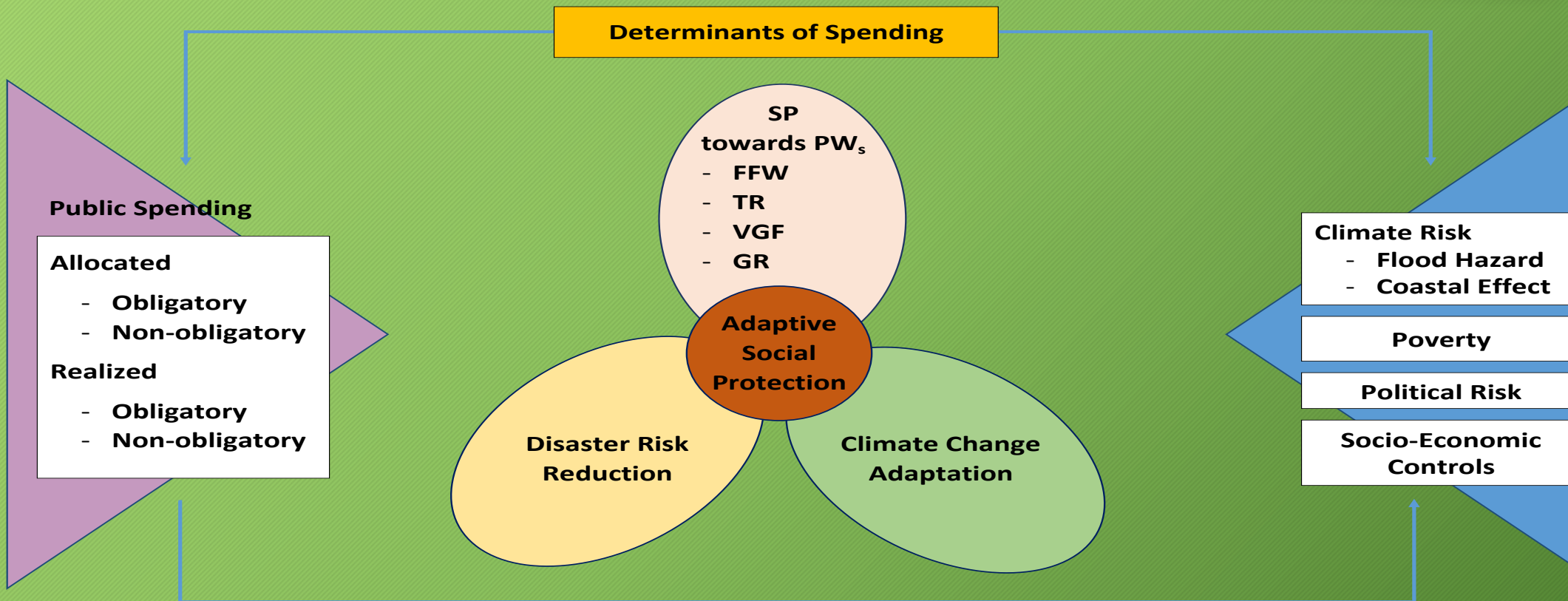
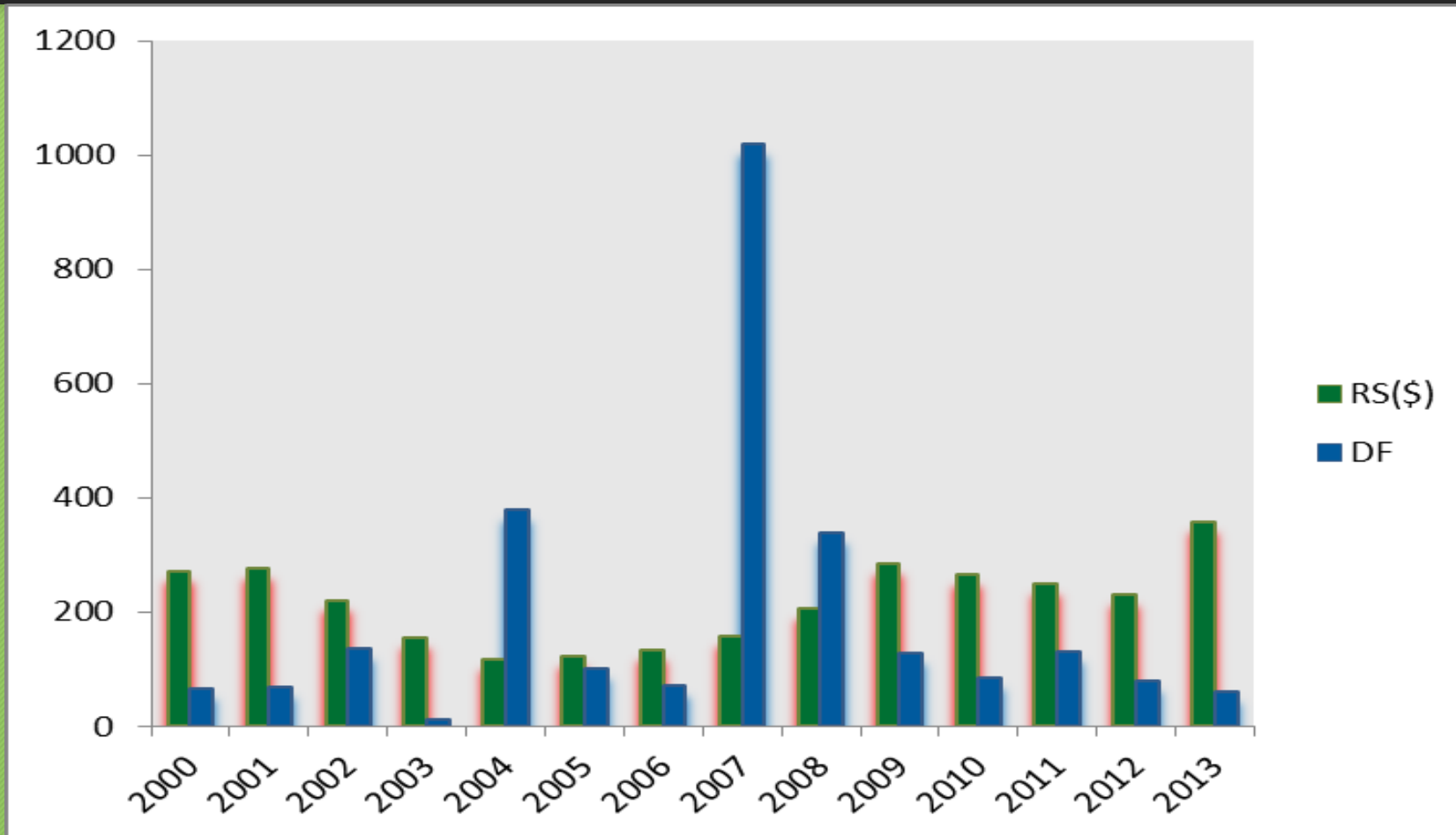


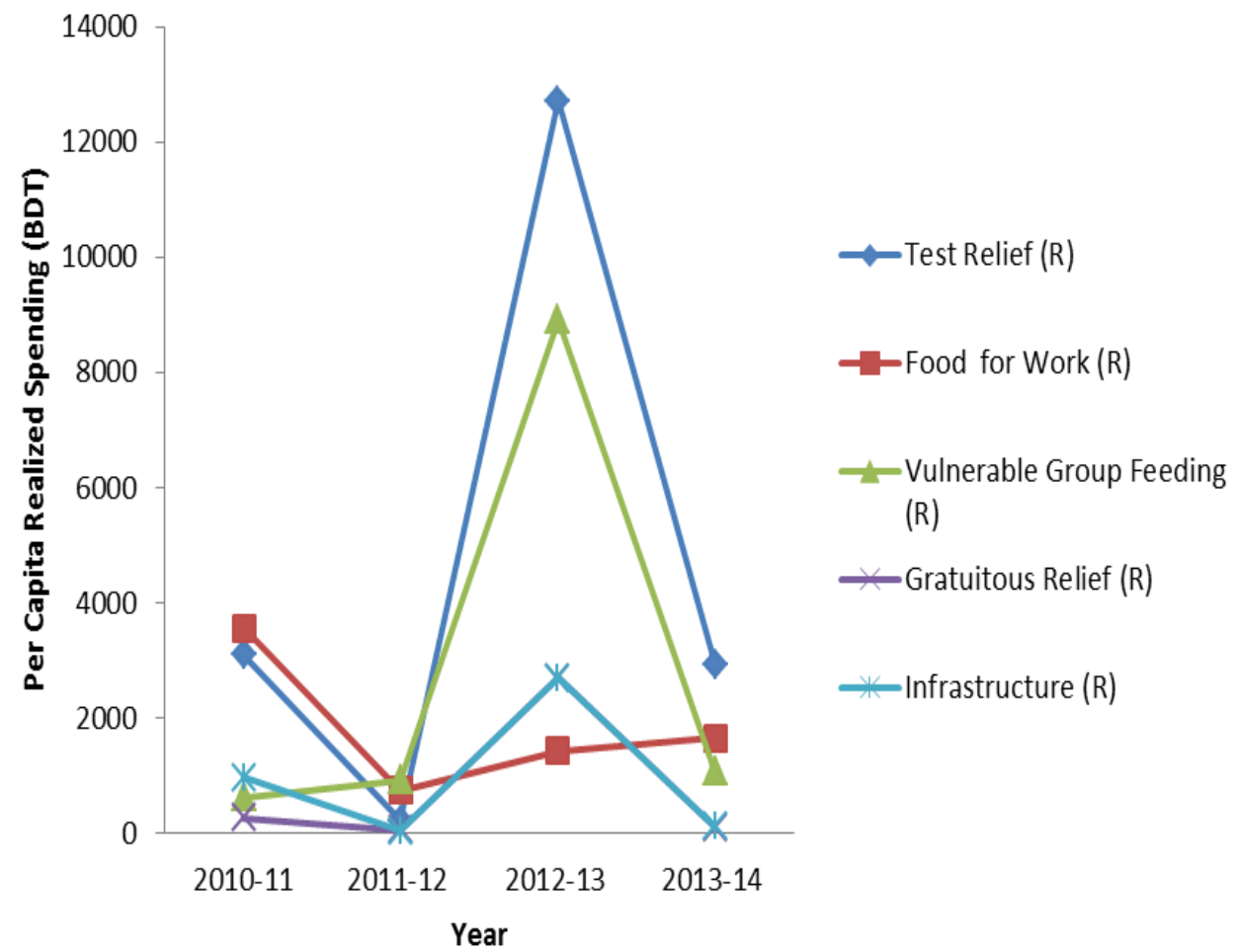
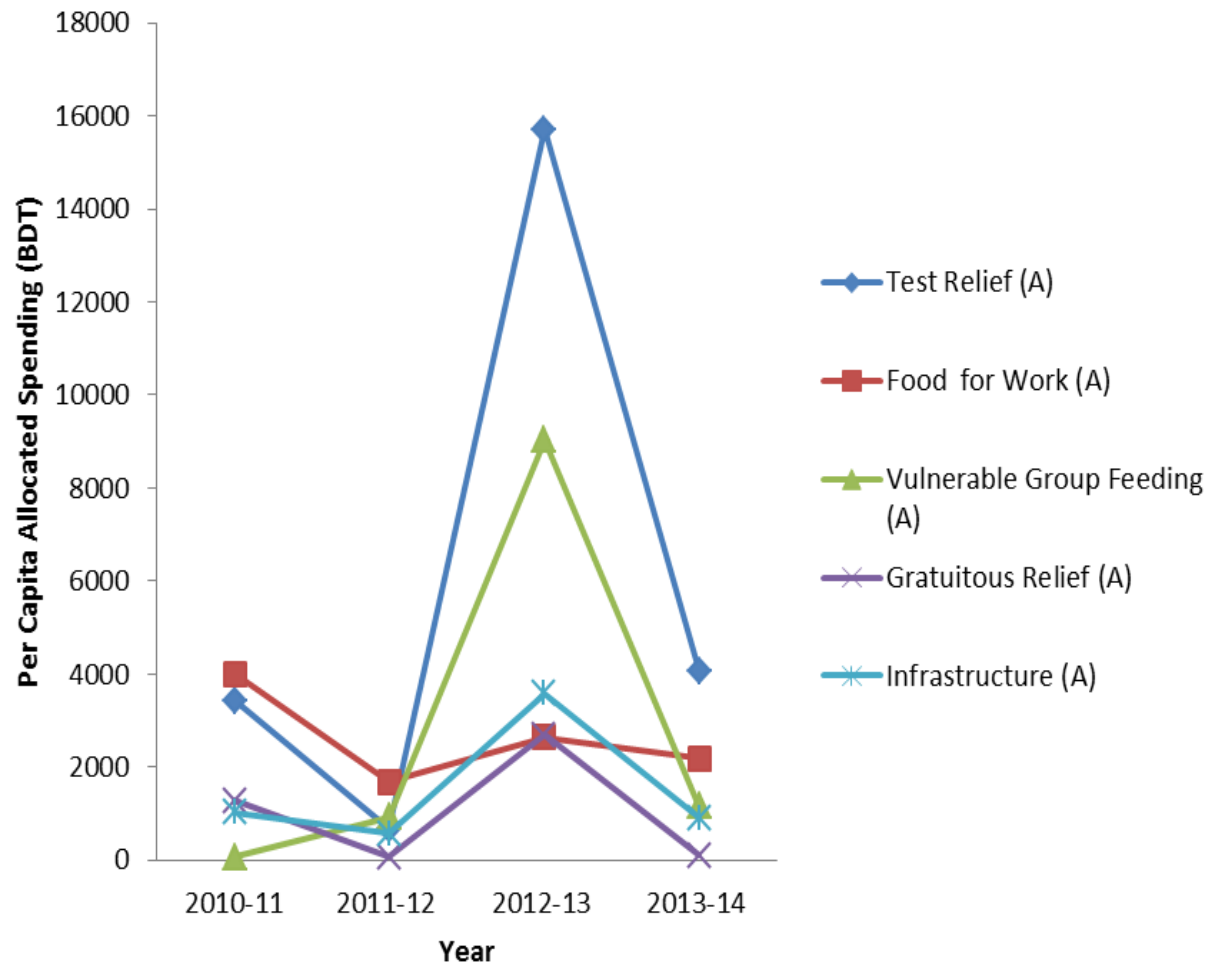
Figure 1: Authors' elaborations of the conceptual framework based on Davies et al. (2009), IPCC (2014) and Karim (2018)

# Links between Regular Spending (RS) and Disaster Funding (DF), 2000-13



Source: Ministry of Finance, GOB and Rahman et al. (2011)

# Per Capita Allocated and Realized Spending by DRR Programs



# DESCRIPTIVE STATISTICS A: DEPENDENT (LHS) VARIABLES



VARIABLES	OBSERVATION	MEAN	STANDARD DEVIATION	MAXIMUM
DRR TOTAL ALLOCATED SPENDING	483	28.92	80.69	968.60
DRR TOTAL REALIZED SPENDING	483	23.17	73.12	966.68
TR ALLOCATED SPENDING	483	12.37	17.59	137.63
TR REALIZED SPENDING	483	9.81	14.29	95.31
FFW ALLOCATED SPENDING	483	5.44	13.48	126.40
FFW REALIZED SPENDING	483	3.82	9.06	90.42
INFRASTRUCTURE ALLOCATED SPENDING	483	3.16	9.59	102.81
INFRASTRUCTURE REALIZED SPENDING	483	1.96	7.55	102.81
GR ALLOCATED SPENDING	483	2.15	20.46	374.93
GR REALIZED SPENDING	483	1.61	17.20	374.93
VGF ALLOCATED SPENDING	483	5.80	42.97	921.98
VGF REALIZED SPENDING	483	5.97	43.01	921.98

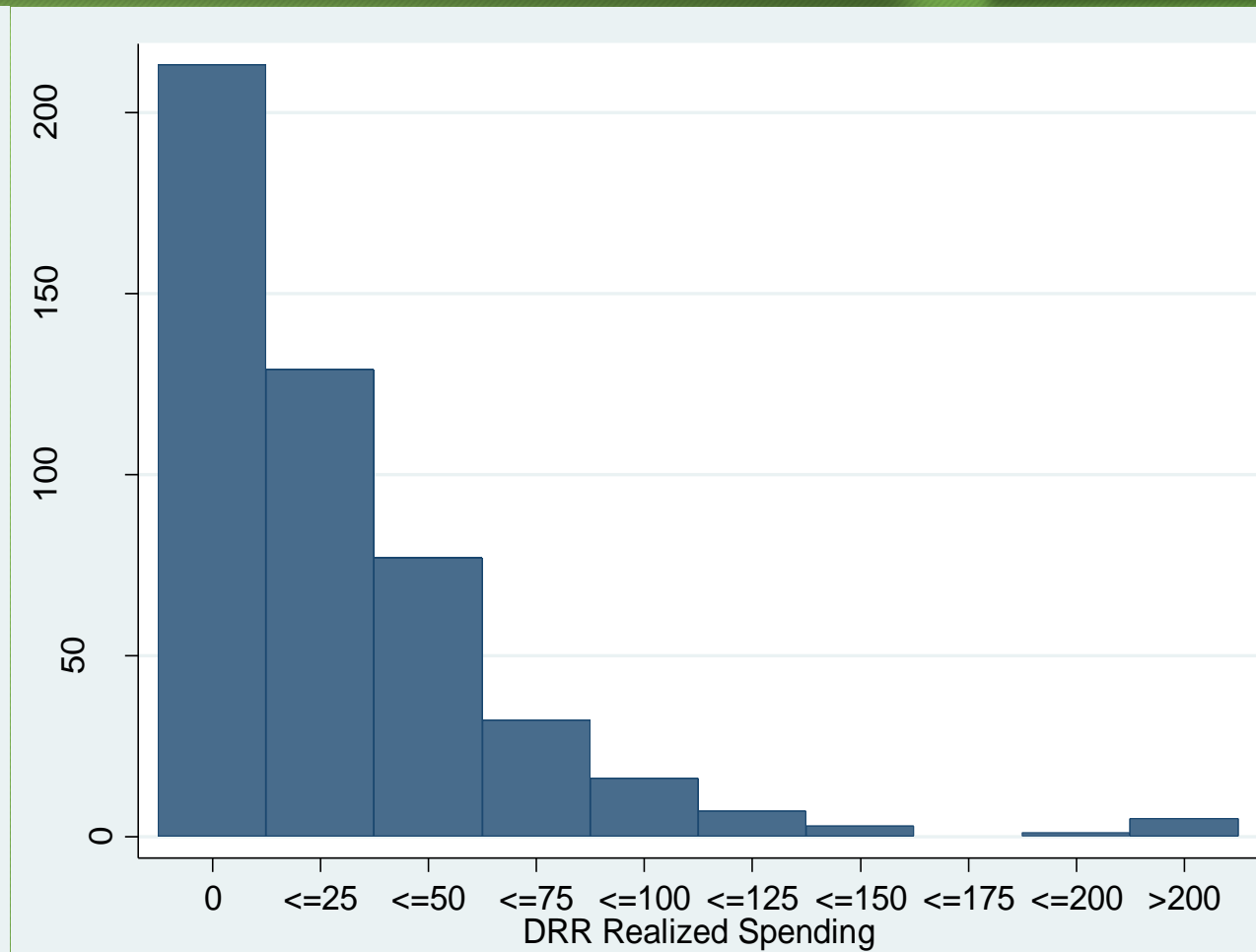
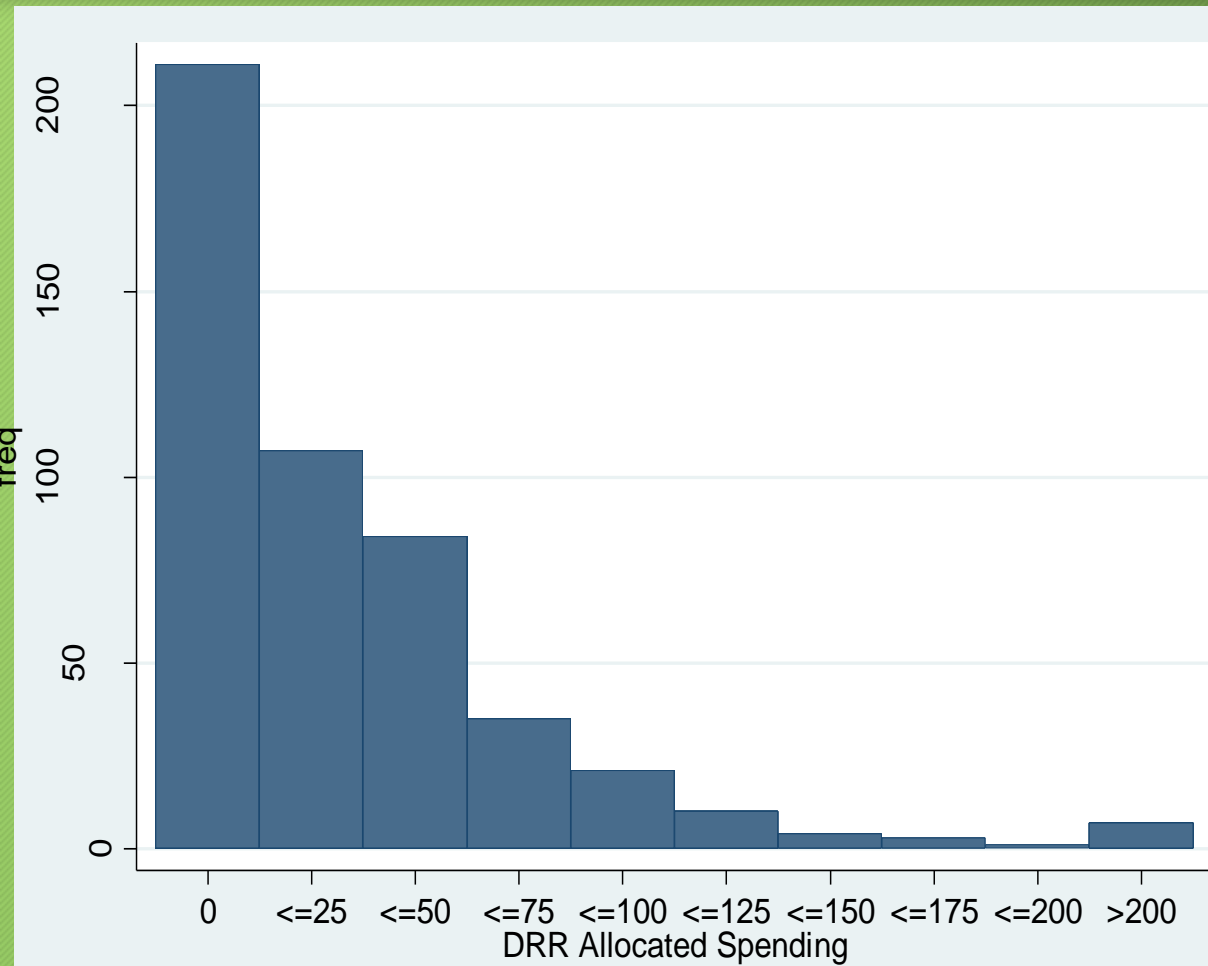
# DESCRIPTIVE STATISTICS B: INDEPENDENT (RHS) VARIABLES



VARIABLES	OBSERVATION	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
UPAZILA FLOOD RISK	483	45.61077	36.24235	0	115
POVERTY RATE	483	28.34	13.24	1.9	68
ECONOMIC DEVELOPMENT	483	52.60	11.12	8.1	73.5
ETHNICITY	483	0.46	0.50	0	1
DISTRICT HEADQUARTER	483	0.13	0.34	0	1
URBAN EFFECT	483	0.04	0.19	0	1
COASTAL EFFECT	483	0.19	0.39	0	1
PUBLIC UNIVERSITY	483	0.37	0.48	0	1
POPULATION	483	255833.4	138584.8	17152	941005
POLITICAL RISK	483	0.78	0.42	0	1



# DISASTER RISK REDUCTION (DRR) PER CAPITA SPENDING DISTRIBUTION



# METHODOLOGICAL FRAMEWORK



$$\text{SPEND}_{ij} = f(\text{risk}_i; \text{pop}_i; \text{pov}_i; \text{dev}_i; D_i)$$

Here, Public spending ( $\text{SPEND}_{ij}$ ) in sub-district (i), for program (j), is a function of several variables: risk is calculated as an index constructed from past exposure as defined earlier; the population (pop) and poverty (pov) rates in the receiving sub-district; and a composite measure of economic development (dev: a composite measure indicating access to electricity, water and sanitation). The binary independent variables (vector D), include political affiliation with respect to ruling party representations, presence of ethnic minorities, being a district headquarter, being a sub-district in either of the two large megacities, presence of a public university and being located by the coast.

# METHODOLOGICAL FRAMEWORK



Given the censored nature of the dependent variable, we estimate the following Tobit regression model to account for the censored data and arrive at consistent coefficient estimates:<sup>19</sup>

$$y^x_{ij} = \beta X_{ij} + u_{ij}$$

$$y^x_{ij} = \begin{cases} y^{x*}_{ij} & \text{if } SPEND^x_{ij} > 0 \\ 0 & \text{if } SPEND^x_{ij} = 0 \end{cases}$$

Where  $y^x_{ij}$  is the dependent variable of the outcome equation,  $X_{ij}$  is a vector of covariates,  $\beta$  is a vector of coefficients and  $u_{ij}$  is the random disturbance term. We estimate our model with robust standard errors clustered by sub-districts.

# ESTIMATION RESULTS

## Determinants of Total Allocated and Realized Spending



VARIABLES	TOTAL ALLOCATED SPENDING	TOTAL REALIZED SPENDING
UPAZILA FLOOD RISK	0.384* (0.201)	0.408** (0.191)
POVERTY RATE	1.107* (0.638)	1.088* (0.571)
ECONOMIC DEVELOPMENT	0.423 (0.489)	0.446 (0.451)
ETHNICITY	1.787 (13.08)	4.659 (11.33)
DISTRICT HEADQUARTER	10.71 (14.21)	11.38 (12.75)
URBAN EFFECT	-45.32* (23.16)	-41.97* (22.15)
COASTAL EFFECT	55.05*** (18.23)	48.38*** (18.19)
PUBLIC UNIVERSITY	8.387 (8.767)	8.668 (7.160)
POPULATION	-1.03e-07 (3.87e-05)	-6.14e-06 (3.32e-05)
POLITICAL RISK	-13.02 (11.80)	-13.02 (10.91)
CONSTANT	-81.28 (49.80)	-84.42* (48.24)
SIGMA	93.12*** (19.20)	81.92*** (20.73)
OBSERVATIONS	483	483

# Determinants of Obligatory and Non-Obligatory Spending



VARIABLES	OBLIGATORY ALLOCATED SPENDING	OBLIGATORY REALIZED SPENDING	INFRASTRUCTURE ALLOCATED SPENDING	INFRASTRUCTURE REALIZED SPENDING	NON-OBLIGATORY ALLOCATED SPENDING	NON-OBLIGATORY REALIZED SPENDING
UPAZILA FLOOD RISK	0.183** (0.0900)	0.172** (0.0713)	0.0824** (0.0396)	0.0765** (0.0346)	0.174 (0.202)	0.234 (0.207)
POVERTY RATE	0.417 (0.282)	0.382** (0.189)	0.126 (0.0807)	0.116* (0.0659)	0.875 (0.669)	0.901 (0.671)
ECONOMIC DEVELOPMENT	0.171 (0.249)	0.0946 (0.205)	-0.0477 (0.0933)	-0.0422 (0.0807)	0.593 (0.632)	0.817 (0.657)
ETHNICITY	-6.305 (6.767)	-3.481 (4.629)	-2.286 (2.070)	-1.622 (1.397)	14.56 (14.59)	14.60 (14.49)
DISTRICT HEADQUARTER	8.340 (9.495)	7.761 (8.067)	4.183 (3.746)	4.272 (3.653)	0.788 (14.06)	1.484 (13.88)
URBAN EFFECT	-21.81** (9.910)	-17.19** (7.854)	-4.469 (3.493)	-2.998 (2.900)	-56.31 (37.17)	-56.98 (37.29)
COASTAL EFFECT	23.86*** (5.677)	19.99*** (4.414)	5.797*** (1.357)	4.165*** (1.134)	59.62** (27.32)	52.39** (26.58)
PUBLIC UNIVERSITY	7.524 (5.458)	6.398* (3.772)	2.116 (1.408)	1.317 (1.049)	-0.629 (9.324)	0.665 (9.085)
POPULATION	9.49e-07 (2.42e-05)	-4.99e-06 (1.83e-05)	-7.60e-06 (7.54e-06)	-8.35e-06 (6.82e-06)	8.18e-06 (3.74e-05)	7.37e-06 (3.67e-05)
POLITICAL RISK	-5.546 (5.729)	-4.016 (4.390)	1.527 (1.576)	0.764 (1.218)	-16.09 (14.65)	-17.85 (14.84)
CONSTANT	-26.04 (19.16)	-21.78 (14.08)	-9.255* (5.274)	-8.506** (4.003)	-130.8* (73.51)	-143.1* (77.30)
SIGMA	49.04*** (4.241)	36.36*** (2.881)	14.73*** (2.481)	11.84*** (2.636)	90.48*** (30.98)	88.37*** (31.99)
OBSERVATIONS	483	483	483	483	483	483

# ROBUSTNESS CHECKS



VARIABLES	TOTAL ALLOCATED SPENDING (TOBIT)	TOTAL ALLOCATED SPENDING (OLS)	TOTAL REALIZED SPENDING (TOBIT)	TOTAL REALIZED SPENDING (OLS)
UPAZILA FLOOD RISK	0.384* (0.201)	0.201* (0.120)	0.408** (0.191)	0.231** (0.111)
POVERTY RATE	1.107* (0.638)	0.708* (0.413)	1.088* (0.571)	0.701* (0.359)
ECONOMIC DEVELOPMENT	0.423 (0.489)	-0.0260 (0.252)	0.446 (0.451)	0.0555 (0.221)
ETHNICITY	1.787 (13.08)	5.755 (8.654)	4.659 (11.33)	7.116 (7.593)
DISTRICT HEADQUARTER	10.71 (14.21)	10.73 (7.453)	11.38 (12.75)	10.53 (6.747)
URBAN EFFECT	-45.32* (23.16)	-30.94** (14.41)	-41.97* (22.15)	-28.50** (13.87)
COASTAL EFFECT	55.05*** (18.23)	28.86** (11.51)	48.38*** (18.19)	24.37** (10.77)
PUBLIC UNIVERSITY	8.387 (8.767)	-2.704 (5.259)	8.668 (7.160)	-1.937 (4.284)
POPULATION	-1.03e-07 (3.87e-05)	-2.48e-05 (2.17e-05)	-6.14e-06 (3.32e-05)	-2.83e-05 (1.87e-05)
POLITICAL RISK	-13.02 (11.80)	-6.642 (7.656)	-13.02 (10.91)	-7.684 (7.117)
CONSTANT	-81.28 (49.80)	5.202 (21.06)	-84.42* (48.24)	-4.440 (17.64)
SIGMA	93.12*** (19.20)	5.202 (21.06)	81.92*** (20.73)	-4.440 (17.64)
OBSERVATIONS	483	483	483	483

# CONCLUSION AND POLICY REMARKS



- Our results strongly suggest that flood risk and coastal location and proximity are indeed significant indicators for public spending at the subnational level in Bangladesh, both aggregated and disaggregated by types of spending.
- Poverty rate, an indicator of socio-economic vulnerability, is found to be a robust indicator of adaptive disaster risk reduction funding with higher poverty associated with more funding.
- We consistently fail to find any significance for close political affiliation in attracting sub-district level public funding for disaster risk reduction and climate adaptation.
- It is re-assuring that, at least in the Bangladesh Government case, much of the funding that is targeting these goals appear to be directed appropriately.

# HIGHLIGHTS



- Unique subnational analysis to understand rationale of adaptive disaster risk reduction spending allocation in Bangladesh.
- Dataset for 483 sub-districts tracking various social protection programs' for FY 2010-11 to 2013-14 had been utilized.
- Flood hazard risk and socio-economic vulnerability are found positively correlated equally consistent robust determinants.
- Political affiliation and urban proximity consistently failed to attract intra-regional ADRR funding allocation.
- Public spending for ADRR can be useful intervention tool to other DRR programs e.g. insurance or broader social transfers.





**Thank you for your kind attention!!**

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