

# CLIMATE CHANGE ADAPTATION FINANCING IN SIDS

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# INTRODUCTION

- Small island developing states (SIDS) are among the countries in the world that are most vulnerable to the impacts of climate change.
- SIDS have prioritised adaptation to climate change, but given the cost and their limited domestic financial resources, many have looked to attract international financing.
- It is commonly argued that SIDS are disadvantaged in their access to such funding compared to other developing countries but there is little empirical evidence in the academic literature to support this claim.
- Research on climate change adaptation financing in SIDS is limited. There is only one other study of which the authors are aware, currently unpublished, that considers bilateral allocations of climate adaptation financing to SIDS.
- This paper aims to address this gap in the literature, and more broadly, explores the experience of SIDS with international climate change adaptation financing.

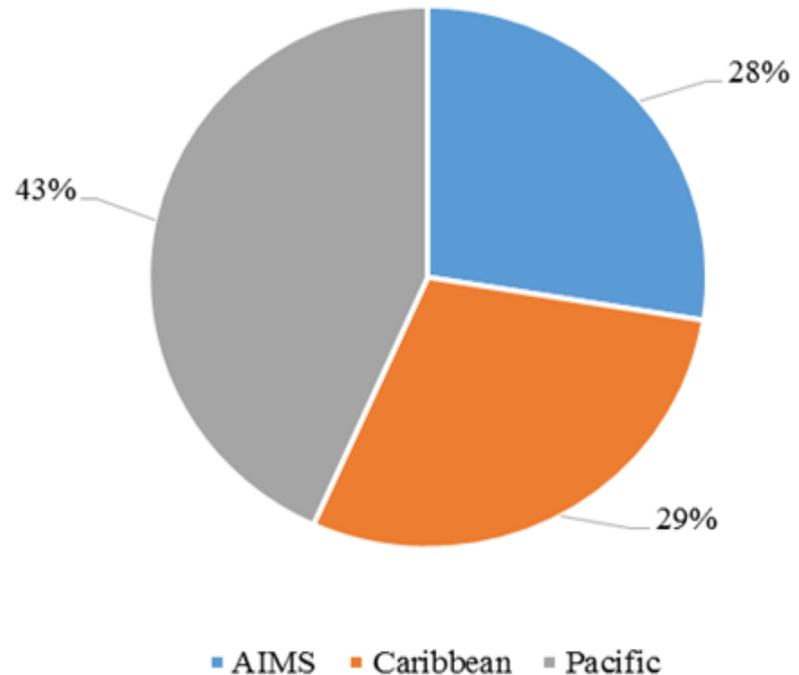
# NOTES ABOUT THE DATA (AND CAVEATS)

- The “Rio Markers system is [so far] the most advanced initiative to monitor, report, and verify financial and investment flows across a range of countries at both ends and in sectors” (Huhtala et al. 2010).
- When reporting official development assistance (ODA) through the Creditor Reporting System, OECD Development Assistance Committee (DAC) Members indicate which (if any) of the four Rio markers the committed aid funds target – mitigation, adaptation, biodiversity and/or desertification – and whether this is the principal or a significant objective of the development assistance.
- Adaptation financing is self-reported and does not include financing provided by non-DAC countries or multilateral agencies such as the World Bank (although some bilateral partner commitments to multilateral funds concerned with adaptation are reported).
- Data is provided from 2010, and some authors (e.g. Huhtala *et al.* 2010) have reservations about its reliability prior to 2013.

# AN OVERVIEW

- Climate change adaptation financing committed by the OECD DAC Members to SIDS was an estimated US\$1,419 million between 2010-13. This amount, which represents 4% of total adaptation financing to all developing countries, was 24% less than climate change mitigation financing provided over the same period.
- Allocation of funding was highly skewed. 10 SIDS received 73% of total adaptation commitments for SIDS (out of 40 SIDS covered in this study). Cape Verde alone accounted for 16%.

Total Adaptation Financing Commitments to Small Island Developing States, by Region (%), 2010-2013



# DETERMINANTS OF ADAPTATION FINANCING

- We ran OLS and Tobit multivariate regressions in order to explore the determinants of climate change adaptation financing:
  - i. Whether SIDS are disadvantaged in their access to climate change adaptation funds (i.e., determinants of allocation of climate change adaptation funds across all developing countries), and
  - ii. The allocation of climate change adaptation funds among SIDS
- Our approach was consistent with that used in the aid allocation literature (see for example Alesina and Dollar (2000)).
- Regression analysis is useful as it allows us to isolate the impact of a determinant while accounting/controlling for other possible determinants (or ‘holding them constant’)
  - Take the example of female-male wage differentials. Regression analysis allows us to explore the extent to which wage differentials are not explained by factors such as occupations and education levels, and in doing so, to estimate the extent of discrimination.

# MODEL SPECIFICATIONS

$$y_c = \alpha + \beta_1 \ln(P_c) + \beta_2(\text{GDPpc}_c) + \beta_3(E_c) + \beta_4(G_c) + X'_c + u_c$$

Where:

$y$  is the amount of climate change adaptation funding committed to country  $c$  over the 2010-13 period,

$P$  is its average population over the same period,

$\text{GDPpc}$  is its average GDP per capita over the period,

$E$  is a proxy for exposure and vulnerability to the impacts of climate change (as measured by the Climate Risk Index, produced by Germanwatch), and

$G$  is a proxy for governance quality (as measured by country  $c$ 's composite score across the six areas that form the World Governance Indicators (WGI))

# MODEL SPECIFICATIONS (IN ENGLISH)

- Independent variables that we expect would explain allocations of climate change adaptation financing (and were included in the model) included:
  - Population
  - GDP per capita
  - Exposure and vulnerability to the impacts of climate change (a proxy was used, in the form of the Climate Risk Index, produced by Germanwatch)
  - Governance quality (a proxy was used, in the form of a composite score across the six areas that form the World Governance Indicators)
- A number of other independent variables are incorporated into iterations of the model:
  - Aid dependence (ODA/GNI)
  - Colonial status in 1945 and 1975 (a dummy variable is used)
  - Whether a country is situated in Africa, is a least developed country (LDC), or is a SIDS (a dummy variable is used)

# REGRESSION RESULTS

## a. Climate Change Adaptation Financing, 2010-13

Model	1	2	3	4
Population (natural log.)	24.876*** (5.968)	25.337*** (6.032)	24.944*** (6.285)	29.002*** (7.357)
GDP per capita	-0.005*** (0.002)	-0.004*** (0.002)	-0.005*** (0.002)	-0.004*** (0.001)
Climate Risk Index	0.367 (0.272)	0.356 (0.280)	-0.355 (0.281)	-0.437 (0.308)
Governance (WGI composite)	42.719** (16.636)	43.603** (16.866)	43.527** (17.013)	47.535*** (17.284)
Aid dependence (ODA/GNI)	—	0.098 (0.442)	0.086 (0.455)	0.126 (0.449)
Colony in 1975	—	—	-3.752 (12.015)	—
Colony in 1945	—	—	—	46.97 (26.898)
N Obs.	128	127	127	127
R-Squared	0.23	0.23	0.23	0.26

OLS estimation where the dependent variable is climate change adaptation financing to developing countries over the period 2010-13. \* denotes statistical significance at the 10% level; \*\* at the 5% level and \*\*\* at the 1% level. Standard errors in parentheses are calculated with White's correction for heteroskedacity. Bilateral climate change adaptation financing is sourced from the OECD.

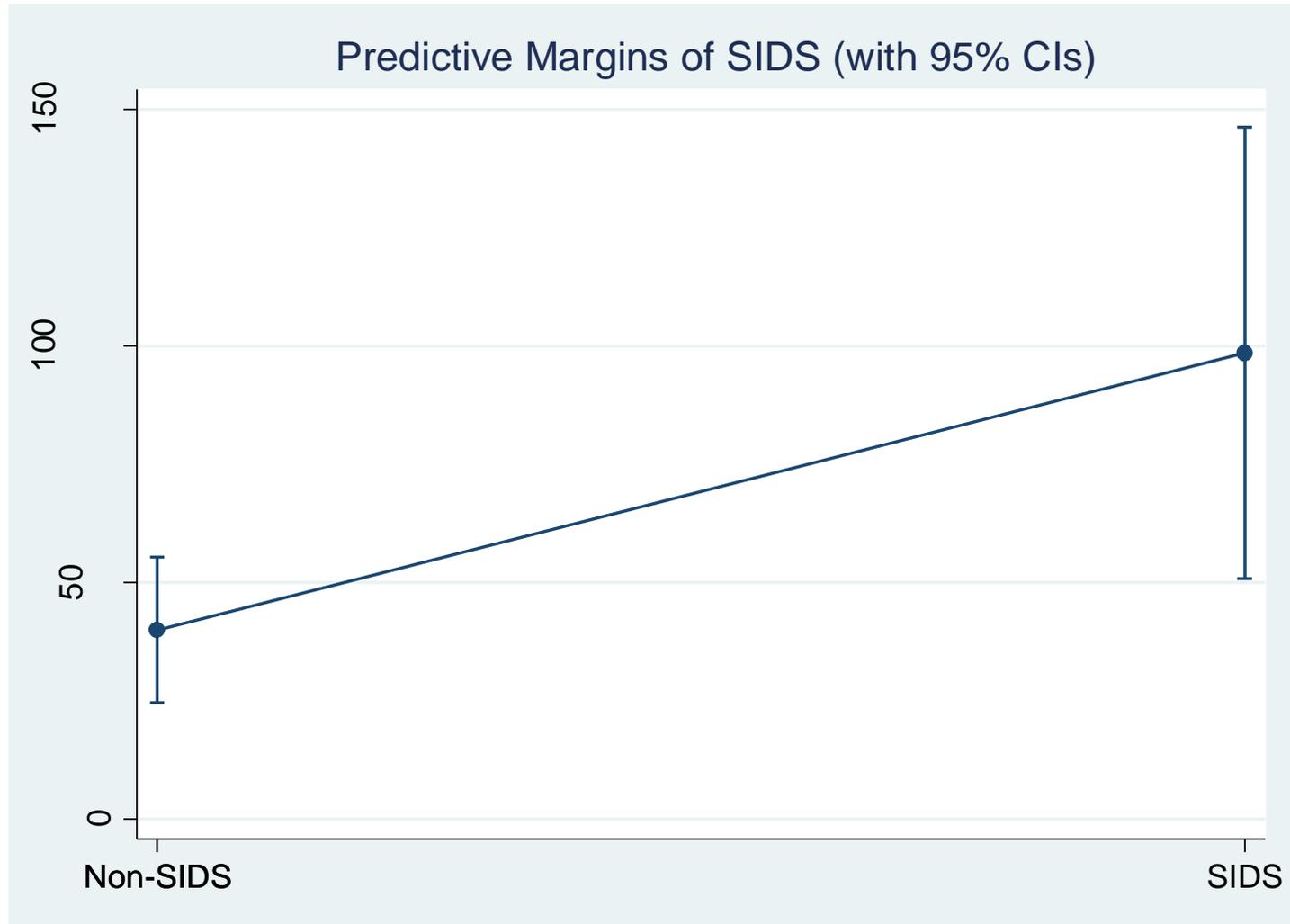
# REGRESSION RESULTS (II)

## b. Climate Change Adaptation Financing, 2010-13

Model		1	2	3	4	5	6	7	8
Population (natural log.)	➔	32.704*** (8.255)	32.728*** (8.373)	33.691*** (8.354)	33.252*** (8.527)	33.000*** (8.538)	32.877*** (8.654)	35.669*** (8.895)	35.283*** (9.470)
GDP per capita	➔	-0.006*** (0.002)	-0.005*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)
Climate Risk Index		-0.310 (0.262)	-0.430* (0.245)	-0.274 (0.267)	-0.386 (0.249)	-0.271 (0.268)	-0.382 (0.249)	-0.358 (0.301)	-0.409 (0.254)
Governance (WGI composite)	➔	45.225*** (16.426)	45.335*** (15.310)	46.822*** (16.666)	46.892*** (15.581)	46.712*** (16.824)	46.766*** (15.724)	49.826*** (17.182)	48.599*** (16.070)
Aid dependence (ODA/GNI)		-		-0.170 (0.433)	-0.485 (0.764)	-0.201 (0.440)	-0.486 (0.766)	-0.103 (0.508)	-0.118 (0.875)
Colony in 1975		-				-7.878 (10.944)	-4.351 (11.682)	-	-
Colony in 1945		-						41.802 (26.601)	39.902 (32.020)
SIDS	➔	54.250** (23.628)	57.960** (23.270)	58.583** (24.116)	61.854*** (23.760)	59.508** (24.039)	62.306*** (23.810)	49.575** (21.539)	52.093** (21.642)
Africa	➔	-	22.490 (21.573)	-	21.288 (21.333)	-	20.778 (21.517)	-	11.672 (26.279)
LDC	➔	-	0.287 (26.675)	-	2.817 (30.909)	-	2.358 (31.259)	-	-5.369 (30.928)
N Obs.		128	128	127	127	127	127	127	127
R-Squared		0.25	0.25	0.25	0.26	0.25	0.26	0.27	0.27

OLS estimation where the dependent variable is climate change adaptation financing to developing countries over the period 2010-13. \* denotes statistical significance at the 10% level; \*\* at the 5% level and \*\*\* at the 1% level. Standard errors in parentheses are calculated with White's correction for heteroskedacity. Bilateral climate change adaptation financing is sourced from the OECD.

# THE IMPACT OF BEING A SIDS



# THE CHALLENGE OF MEASURING VULNERABILITY

Measuring a country's vulnerability to the impacts of climate change is difficult, given scientific uncertainty about the impacts of climate change, and uncertainty about the interaction between climatic changes and the social sphere.

“Indexes of vulnerability to environmental change cannot hope to be meaningful when applied to large-scale systems, and so should focus on smaller scales of analysis. We argue that they should not be used as the basis for disbursing funds, comparing countries, or for measuring the performance of countries in environmental management. We also argue that vulnerability is a context-specific rather than a generic condition.”

Barnett et al. 2008

# REGRESSION RESULTS (SIDS ONLY)

## c. Climate Change Adaptation Financing to Small Island Developing States, 2010-13

Model	1	2	3	4
Population (natural log.)	19.244*** (6.853)	21.783*** (6.631)	22.796*** (7.045)	21.377*** (7.004)
GDP per capita	-0.006*** (0.002)	-0.006*** (0.002)	-0.005*** (0.002)	-0.006*** (0.002)
Climate Risk Index	0.303 (0.227)	0.252 (0.203)	0.233 (0.195)	0.261 (0.211)
Governance (WGI composite)	51.662* (27.951)	58.990** (25.956)	57.872** (25.681)	59.092** (26.429)
Aid dependence (ODA/GNI)	–	2.238*** (0.739)	2.191*** (0.767)	2.230*** (0.730)
Colony in 1975	–	–	9.021 (12.224)	–
Colony in 1945	–	–	–	-3.758 (28.893)
N Obs.	33	33	33	33
R-Squared	0.40	0.54	0.55	0.54

OLS estimation where the dependent variable is climate change adaptation financing to SIDS over the period 2010-13. Over 40 SIDS for which some data were available were included in the regressions, however, this number declined to 33 as a result of some SIDS missing data for one or more independent variables. \* denotes statistical significance at the 10% level; \*\* at the 5% level and \*\*\* at the 1% level. Standard errors in parentheses are calculated with White's correction for heteroskedacity. Bilateral climate change adaptation financing is sourced from the OECD.

# REGRESSION RESULTS (SPECIFIC DONORS)

## d. Bilateral Climate Change Adaptation Financing to Small Island Developing States, 2010-13

Funding source	Population (natural log.)	GDP per capita	Climate Risk Index	Governance (WGI composite)	Aid dependence (ODA/GNI)	Own colony	N obs.
Column	1	2	3	4	7	8	
Australia	-1.462 (2.013)	-0.001 (0.001)	-0.010 (0.047)	4.160 (5.703)	0.919*** (0.252)	51.228*** (11.631)	29
France	21.247 (12.479)	-0.003** (0.001)	0.502 (0.449)	56.776** (21.288)	0.245 (1.306)	65.153** (24.831)	29
New Zealand	-3.031** (1.369)	-0.003** (0.001)	-0.083** (0.037)	-2.279 (4.032)	-0.161 (0.104)	9.236** (3.316)	29
Spain	33.504*** (0.883)	-0.055*** (0.002)	0.427*** (0.014)	127.095*** (3.663)	0.964*** (0.031)	189.602*** (5.771)	29
United Kingdom	0.032** (0.012)	-0.000** (0.000)	-0.000 (0.000)	-0.034 (0.037)	-0.003* (0.001)	0.155*** (0.044)	29

Tobit estimation where the dependent variable is climate change adaptation financing to SIDS from each bilateral funding source over the period 2010-13. \* denotes statistical significance at the 10% level; \*\* at the 5% level and \*\*\* at the 1% level. Standard errors in parentheses. Bilateral climate change adaptation financing is sourced from the OECD. Null results were produced for Portugal, US, Netherlands, owing to limited number of countries to which these donors provide climate change adaptation finance.

# SUMMARY

## WHAT IS NOT SURPRISING

- Smaller states are better off when it comes to per capita allocation of climate change adaptation funds.
- Countries with lower per capita incomes receive more adaptation funding.
- Donors provide more adaptation funding to their former colonies.

# SUMMARY

## WHAT IS SOMEWHAT SURPRISING

- There is no evidence to support the claim that SIDS are disadvantaged relative to other states in their allocation of (bilateral) climate change adaptation funds.
  - But there are caveats associated with this result.
- The allocation of adaptation-tagged ODA among SIDS is highly skewed.
- Governance quality has a considerable (positive) impact on adaptation funds received, and this influence is strongest among SIDS.
  - Could this suggest that effectiveness trumps equity considerations for donors?

# SUMMARY

## WHAT IS SURPRISING

- The allocation of adaptation funds does not follow that of aid more broadly, except in the case of SIDS.
  - The aid literature has linked such correlation to bureaucratic inertia – does this apply for SIDS, or could the ‘re-branding’ of aid as climate adaptation assistance explain the result?
- African countries and LDCs are not allocated more adaptation financing than other countries (not when other variables are taken into account).
- There is no correlation between indices that measure exposure and vulnerability to climate change and funding that is allocated
  - This likely reflects the difficulties in developing such measures



# THANK YOU

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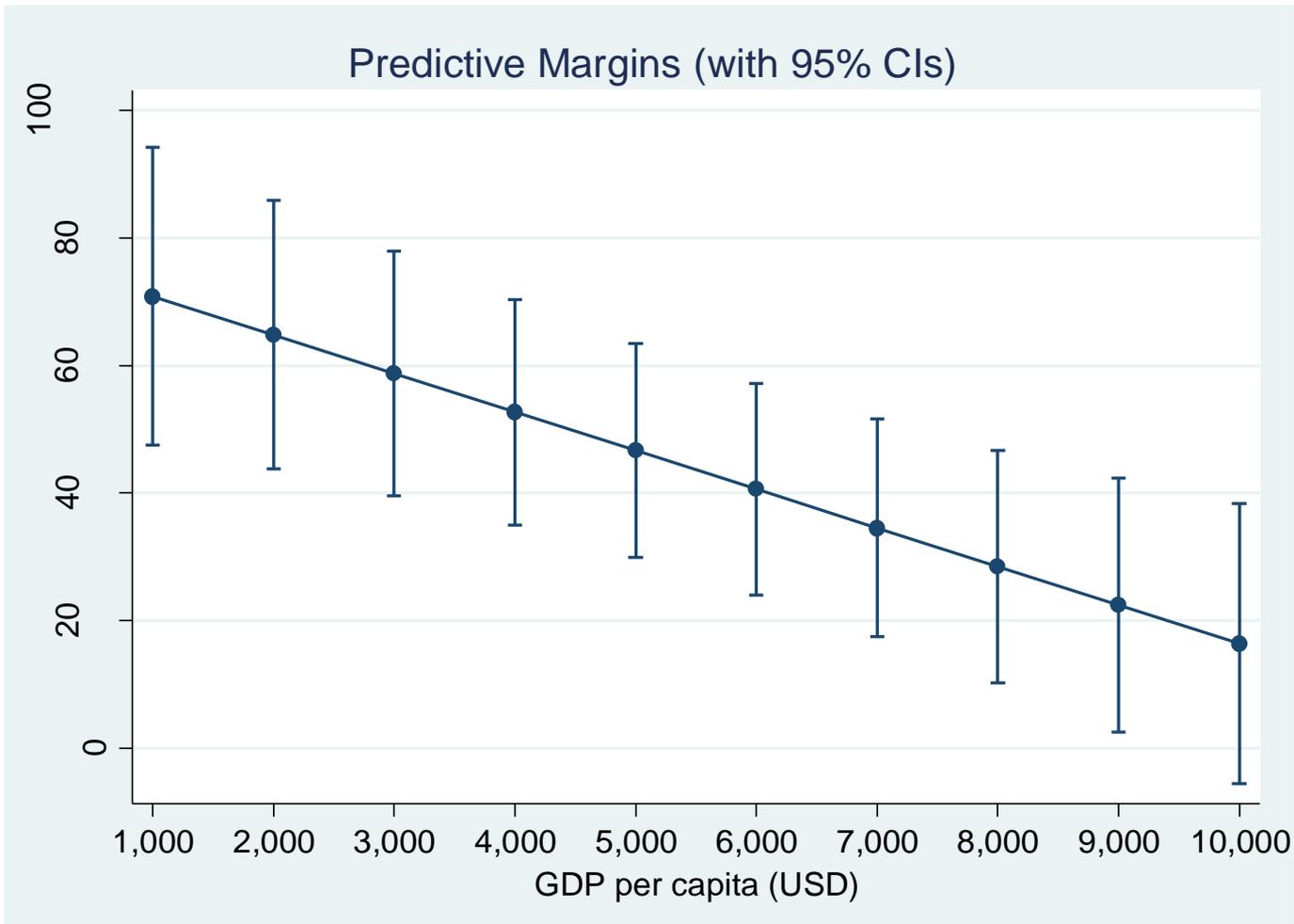
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# THE BROADER RESEARCH PROJECT

- The paper explores the experience of SIDS with international climate change adaptation financing
- We use a mixed methods approach
  - Semi-structured interviews with 65 senior national and regional climate change and finance officials from Pacific and Caribbean SIDS are used to explore the experience of SIDS with international climate change adaptation financing
  - Quantitative analysis of the OECD data on official development assistance (ODA) commitments ‘marked’ as supporting climate change adaptation actions (either as the principal or a significant objective of aid), which is used to:
    - i. explore trends in adaptation financing, and
    - ii. investigate the claim that SIDS are disadvantaged in their access to adaptation financing

# THE IMPACT OF GDP PER CAPITA



# THE IMPACT OF GOVERNANCE

