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# EXPERT ADOPTION OF COMPOSITE INDICES: A RANDOMIZED EXPERIMENT ON MIGRANT RESETTLEMENT DECISIONS IN BANGLADESH

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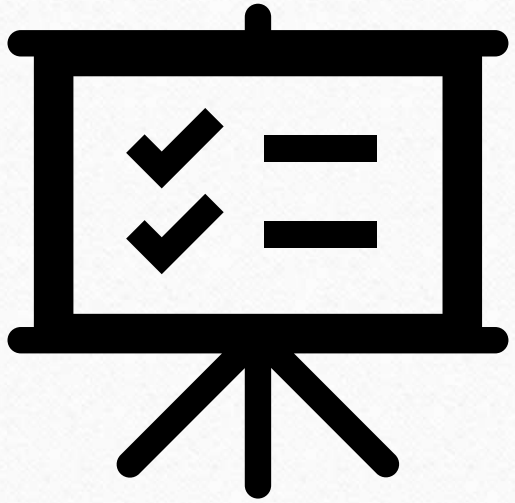
# Outline

- Introduction
- Experimental design and empirical strategy
- Descriptive statistics
- Main results
- Mechanisms
- Heterogenous effects
- Conclusion

# Introduction

- Composite indices receive a lot of attention in debates on international development and sustainability; e.g., Human Development Index (HDI).
- The advantages of such aggregate indices are avoiding over-reliance on individual indicators like GDP per capita, and usefulness for simple comparison, analysis and advocacy (Chowdhury and Squire, 2006).
- These advantages notwithstanding, composite indices have been the source of considerable debate in the academic literature.
- Much of the discussion has revolved around the mechanics of the composite indices: the lack of a clear theoretical framework, the blurring of conceptual clarity that comes from mixing individual dimensions together, the inclusion or exclusion of relevant individual indicators, the aggregation method – including the weights for the individual indicators and the trade-offs this leads to – robustness of rankings and more (Srinavasan, 1994; Ravallion, 2012).

# The Question



If decision makers have access to both **an aggregate index** and underlying information on **individual indicators**, do they **rely on the index** or on their own **aggregation** when making decisions?

# The Randomized Experiment

- We study the effect of having access to a migrant resettlement index on decisions to allocate migrants between host locations within a country.
- The resettlement index aggregates information on **five asset** and **six condition dimensions** central to the livelihood reconstruction of migrants in host locations.
- The experiment was conducted in Bangladesh using graduate students as respondents.

# Experimental Design and Empirical Strategy

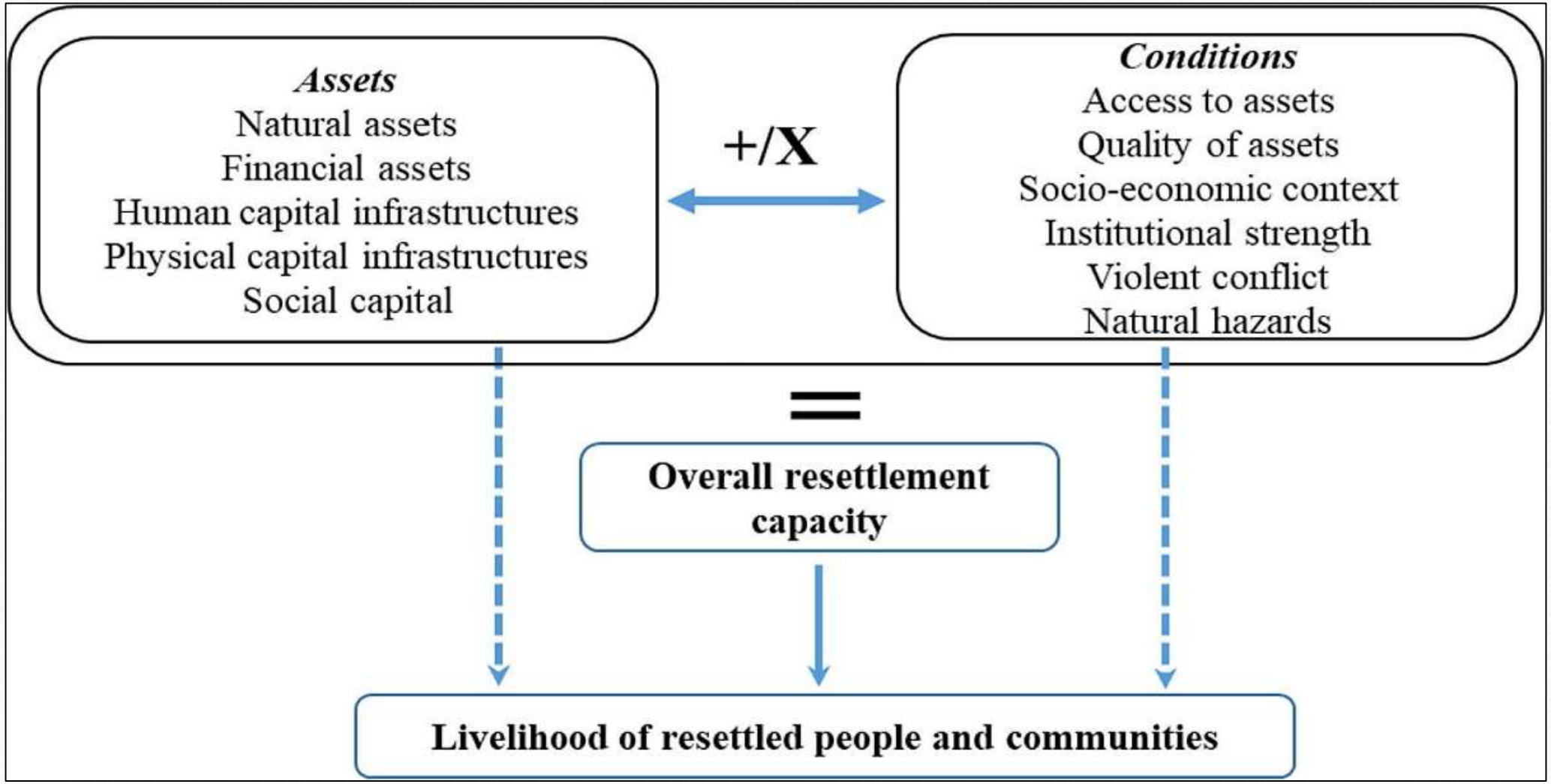
- For testing the effect of the resettlement index on migrant resettlement decisions, **410 Masters students** were employed from Dhaka University and the Dhaka School of Economics.
- The experiment was implemented in group sessions featuring 10-15 respondents at a time, overseen by a team of enumerators.
- After entering basic background information (gender, university, and discipline studied), respondents were shown a **five-minute video** explaining the **Discrete Choice Experiment (DCE)**, the attributes contained in the experiment, including the resettlement index.
- In the discrete choice experiment, respondents were asked to allocate 1000 internal climate migrants between two unions A and B. With two alternatives (Union A and B) over eight choice sets and 410 respondents, our design generates a total of 410*8*2=6560 observations.

# The Resettlement Index

- The index is based on their climate change resettlement capacity (CCRC) framework (Walelign and Lujala, 2022), which focuses on livelihood reconstruction as a key to the successful resettlement of climate change-impacted people and communities. The CCRC framework identifies five asset and six condition subdimensions that capture the availability of different resources to the resettled and factors that constrain or facilitate the use of these resources.

- Here we test the impact of the resettlement index on decision making using data at the union level from Bangladesh. The index has been computed based on **100 underlying individual indicators**, including the **five indicators** that we use as attributes in our discrete choice experiment.

**Figure: Climate Change Resettlement Capacity (CCRC) Assessment Framework**



# Treatment and Control Group

- The respondents were randomly assigned to **three groups** which all faced a discrete choice experiment where the task was to allocate internal migrants between two unnamed host locations in Bangladesh, but where the information available on the two locations vary by treatment arm.

- In the main control group, the two locations are described in terms of **five individual indicators** (below referred to as attributes); i) availability of cropland, ii) distance to hospital, iii) distance to school, iv) poverty incidence, and v) frequency of floods, droughts and cyclones.

- The treatment group received information on the same five individual attributes, but also on the **composite resettlement index**.

# Sample Choice Set for the Treatment Group

| Indicator | Union_A | Union_B |
|---|---|---|
| Cropland per capita | More than average | Less than average |
| Distance to hospital | Shorter than average | Longer than average |
| Distance to school | Shorter than average | Longer than average |
| Poverty incidence | Lower than average | Higher than average |
| Flood, drought, and cyclone events | More than average | Fewer than average |
| Resettlement capacity index | Worse than average | Better than average |

# Sample Choice Set for the Control Group

| Indicator | Union_A | Union_B |
|---|---|---|
| Cropland per capita | More than average | Less than average |
| Distance to hospital | Shorter than average | Longer than average |
| Distance to school | Shorter than average | Longer than average |
| Poverty incidence | Lower than average | Higher than average |
| Flood, drought, and cyclone events | More than average | Fewer than average |

# Second Control Group

- Since any difference in behaviour between the main control group and the treatment group could be driven by the number of attributes (six versus five) rather than the nature of the sixth attribute, we also included a second control group which received information on the five individual attributes plus an irrelevant attribute (**the number of neighbouring administrative units** to the area in question).

- From the responses, we then elicit the effect of each of the attributes on migrant allocations, which allows us to test whether the resettlement index is trusted and used, and its **relative importance** compared to the five individual attributes.

# Sample Choice Set for the Second Control Group

| Indicator | Union_A | Union_B |
|---|---|---|
| Cropland per capita | More than average | Less than average |
| Distance to hospital | Shorter than average | Longer than average |
| Distance to school | Shorter than average | Longer than average |
| Poverty incidence | Lower than average | Higher than average |
| Flood, drought, and cyclone events | More than average | Fewer than average |
| Number of neighbouring unions | Fewer than average | More than average |

# The Hypotheses

**Hypothesis 1**: The resettlement index affects decisions of treatment group

**Hypothesis 2:** Inclusion of the resettlement index reduces the impact of the other five attributes

**Hypothesis 3**: Adding an irrelevant attribute does not affect decisions

**Hypothesis 4:** Adding an irrelevant attribute does not affect the impact of the other five attributes.

# Table: Descriptive Statistics (by respondents)

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Control five | 410 | 0.332 | 0.471 | 0 | 1 |
| Treatment | 410 | 0.334 | 0.472 | 0 | 1 |
| Control six | 410 | 0.334 | 0.472 | 0 | 1 |
| Belief in index team | 408 | 2.909 | 0.618 | 0 | 4 |
| Index understanding | 402 | 2.846 | 0.741 | 0 | 4 |
| Belief additional information | 406 | 2.815 | 0.791 | 0 | 4 |
| Decision making efficiency | 402 | 2.709 | 0.825 | 0 | 4 |
| Decision time saved | 404 | 2.832 | 0.785 | 0 | 4 |
| Reduced accountability | 397 | 2.463 | 0.863 | 0 | 4 |
| Correct index position | 137 | 0.547 | 0.500 | 0 | 1 |
| Male | 410 | 0.612 | 0.488 | 0 | 1 |
| Urban | 410 | 0.520 | 0.500 | 0 | 1 |
| Economics | 410 | 0.663 | 0.473 | 0 | 1 |
| Migration history | 410 | 0.459 | 0.499 | 0 | 1 |
| Migration to home region | 404 | 0.606 | 0.489 | 0 | 1 |
| Cropland scarce | 410 | 0.612 | 0.488 | 0 | 1 |
| Hospital distant | 410 | 0.454 | 0.498 | 0 | 1 |
| School distant | 410 | 0.254 | 0.436 | 0 | 1 |
| Poverty high | 410 | 0.422 | 0.494 | 0 | 1 |
| Floods, droughts, and cyclones frequent | 410 | 0.371 | 0.484 | 0 | 1 |
| Attitude to migrants | 407 | 0.231 | 0.422 | 0 | 1 |
| Attitude to climate change | 410 | 0.578 | 0.494 | 0 | 1 |

# Table: Main results

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *Dependent variable* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* |
| *Sample* | *Control five* | *Treatment* | *Control six* | *Full* |
| Cropland per capita | 46.256*** | 28.334** | -12.821 | 46.256*** |
| | (11.97) | (12.10) | (11.30) | (11.96) |
| Distance to hospital | 61.656*** | 67.797*** | 63.945*** | 61.656*** |
| | (11.97) | (12.10) | (11.30) | (11.96) |
| Distance to school | 43.219*** | 36.965*** | 54.657*** | 43.219*** |
| | (11.97) | (12.10) | (11.30) | (11.96) |
| Poverty incidence | 52.417*** | 31.104** | 17.204 | 52.417*** |
| | (11.97) | (12.10) | (11.30) | (11.96) |
| Flood, drought, and cyclone events | 82.086*** | 62.597*** | 43.697*** | 82.086*** |
| | (11.97) | (12.10) | (11.30) | (11.96) |
| Resettlement index | | 71.060*** | | |
| | | (12.10) | | |
| Number of neighbouring unions | | | 2.526 | |
| | | | (11.30) | |
| Treatment*Cropland per capita | | | | -17.922 |
| | | | | (17.15) |
| Treatment*Distance to hospital | | | | 6.141 |
| | | | | (17.15) |
| Treatment*Distance to school | | | | -6.253 |
| | | | | (17.15) |
| Treatment*Poverty incidence | | | | -21.313 |
| | | | | (17.15) |
| Treatment*Flood, drought, and cyclone events | | | | -19.490 |
| | | | | (17.15) |
| Control six*Cropland per capita | | | | -59.077*** |
| | | | | (16.45) |
| Control six*Distance to hospital | | | | 2.289 |
| | | | | (16.45) |
| Control six*Distance to school | | | | 11.438 |
| | | | | (16.45) |
| Control six*Poverty incidence | | | | -35.213** |
| | | | | (16.45) |
| Control six*Flood, drought, and cyclone events | | | | -38.389** |
| | | | | (16.45) |
| Constant | 357.183*** | 351.071*** | 415.396*** | 386.887*** |
| | (13.52) | (15.52) | (14.27) | (7.82) |
| r2 | 0.100 | 0.095 | 0.063 | 0.077 |
| N | 2176 | 2192 | 2192 | 6560 |

# Main Results

- The results in column two show that respondents in the treatment group **use the resettlement index** when choosing to allocate migrants between the two unions; the union that scores better on the index is on **average allocated an additional 71 migrants** according to the point estimate.
- Compared to the main control group, there are notable drops in the coefficients of three of the attributes when the resettlement index is added; cropland per capita, poverty incidence, and floods, droughts, and cyclones all **see drops of about 20 units (insignificant).**
- As expected, the attribute **presumed to be irrelevant** (number of neighbouring unions) is in fact irrelevant to the resettlement decisions (column three). But its inclusion reduces the coefficients of the same three variables as in the treatment group.

# Main Results contd…

- Floods, droughts and cyclone events emerges as the **relatively most influential** one; the more favourable location is on average allocated **82 more migrants** than the less favourable one.

- The coefficient of this attribute is also statistically greater than those of three of the other attributes; **cropland per capita (p= .0291), distance to school (p= .0185), and poverty incidence (p= .0929),** though not statistically greater than the **distance to hospital**, nor are the other coefficients statistically different from each other.

- The pattern that emerges from this is nevertheless that for future decision-makers in heavily climate change-exposed Bangladesh, **past environmental damage** matters for the assessment of which areas are favourable for future settlement decisions, and more so than agricultural and economic conditions, and certain forms of infrastructure (schools).

# Main Results contd…

- We run conditional **logit analyses**, using a dummy variable for the union allocated the largest number of migrants as the dependent variable.

- We do this to demonstrate that our results **are robust to more traditional methods** of analyzing discrete choice experiment data

- Odds ratios show that the values **higher than one signify more refugees allocated to unions** that do better on the attributes in question, and values lower than one signify fewer refugees allocated to the more favourable union, the results from the conditional logit analysis are qualitatively similar to our main results using linear fixed effects regressions.

# Mechanism: *How this process works?*

- Judging from its impact on migrant allocation decisions in the discrete choice experiment, our respondents appear to view the resettlement index as useful.
- One set of reasons for using the index could be that our respondents see the index as facilitating better allocation decisions.
- The lack of significance of the irrelevant sixth attribute in the second control group suggests that the fact that being the last attribute in itself does not mean it is given attention.
- Since the index was introduced in the video preceding the experiment, its importance in decision-making could also be due to experimenter demand effects.

# Heterogenous Effects

- Views on the proper allocation of migrants across resettlement locations are likely to **similarly depend on the background of the respondent**, life experiences, and formed beliefs and attitudes.
- General traits like **gender and whether you grew up in a rural or urban** community come with different experiences which may influence views on resettlement.
- Moreover, specific experiences related to migration, such as **having migrated yourself or being from an area with substantial in-migration** may give you a different view of what an area needs to be a good destination for migrants.
- **Attitudes towards migrants and towards climate change** may influence responses, with the possibility that those more critical to either phenomenon take the allocation task in our experiment less seriously.

# Table: Heterogeneous effects by gender, urban background, and discipline studied

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dependent variable* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* |
| *Sample* | *Control five* | *Treatment* | *Control five* | *Treatment* | *Control five* | *Treatment* |
| *Interaction variable* | *Male* | *Male* | *Urban* | *Urban* | *Economics* | *Economics* |
| Cropland per capita | 84.726*** | 12.335 | 29.397* | 5.504 | 28.250 | 9.750 |
| | (19.35) | (18.46) | (16.55) | (17.37) | (18.75) | (20.37) |
| Distance to hospital | 19.120 | 67.995*** | 85.579*** | 57.077*** | 59.317*** | 34.312* |
| | (19.35) | (18.46) | (16.55) | (17.37) | (18.75) | (20.37) |
| Distance to school | 35.130* | 26.439 | 57.524*** | 11.673 | 27.017 | 35.625* |
| | (19.35) | (18.46) | (16.55) | (17.37) | (18.75) | (20.37) |
| Poverty incidence | 74.072*** | 45.778** | 16.357 | 7.198 | 45.600** | 56.125*** |
| | (19.35) | (18.46) | (16.55) | (17.37) | (18.75) | (20.37) |
| Flood, drought, and cyclone events | 85.495*** | 48.137*** | 71.429*** | 76.673*** | 84.317*** | 53.687*** |
| | (19.35) | (18.46) | (16.55) | (17.37) | (18.75) | (20.37) |
| Resettlement index | | 96.014*** | | 61.593*** | | 87.187*** |
| | | (18.46) | | (17.37) | | (20.37) |
| *Interaction variable* *Cropland per capita | -62.285** | 26.094 | 31.408 | 41.703* | 32.220 | 26.247 |
| | (24.53) | (24.36) | (23.69) | (24.08) | (24.30) | (25.20) |
| *Interaction variable* *Distance to hospital | 68.868*** | -0.323 | -44.569* | 19.583 | 4.187 | 47.293* |
| | (24.53) | (24.36) | (23.69) | (24.08) | (24.30) | (25.20) |
| *Interaction variable* *Distance to school | 13.096 | 17.168 | -26.651 | 46.200* | 28.993 | 1.893 |
| | (24.53) | (24.36) | (23.69) | (24.08) | (24.30) | (25.20) |
| *Interaction variable* *Poverty incidence | -35.060 | -23.933 | 67.181*** | 43.669* | 12.199 | -35.339 |
| | (24.53) | (24.36) | (23.69) | (24.08) | (24.30) | (25.20) |
| *Interaction variable* *Flood, drought, and cyclone ev | -5.519 | 23.583 | 19.856 | -25.713 | -3.991 | 12.583 |
| | (24.53) | (24.36) | (23.69) | (24.08) | (24.30) | (25.20) |
| *Interaction variable* *Resettlement index | | -40.699* | | 17.294 | | -22.778 |
| | | (24.36) | | (24.08) | | (25.20) |
| Constant | 357.183*** | 351.071*** | 357.183*** | 351.071*** | 357.183*** | 351.071*** |
| | (13.47) | (15.52) | (13.40) | (15.47) | (13.50) | (15.50) |
| r2 | 0.114 | 0.100 | 0.113 | 0.105 | 0.103 | 0.100 |
| N | 2176 | 2192 | 2176 | 2192 | 2176 | 2192 |

# Table: Heterogeneous effects by respondent migration history and extent to migration to home region

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *Dependent variable* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* |
| *Sample* | *Control five* | *Treatment* | *Control five* | *Treatment* |
| *Interaction variable* | *Migration history* | *Migration history* | *Migration to home region* | *Migration to home region* |
| Cropland per capita | 61.954*** | 37.506** | 90.784*** | 9.036 |
| | (15.50) | (15.86) | (18.40) | (20.93) |
| Distance to hospital | 57.974*** | 66.724*** | 63.581*** | 54.141*** |
| | (15.50) | (15.86) | (18.40) | (20.93) |
| Distance to school | 55.099*** | 39.494** | 52.733*** | 60.078*** |
| | (15.50) | (15.86) | (18.40) | (20.93) |
| Poverty incidence | 73.421*** | 47.468*** | 80.360*** | 52.995** |
| | (15.50) | (15.86) | (18.40) | (20.93) |
| Flood, drought, and cyclone events | 90.230*** | 58.647*** | 112.691*** | 84.193*** |
| | (15.50) | (15.86) | (18.40) | (20.93) |
| Resettlement index | | 78.545*** | | 86.172*** |
| | | (15.86) | | (20.93) |
| *Interaction variable* *Cropland per capita | -35.583 | -21.299 | -77.481*** | 27.420 |
| | (24.22) | (24.51) | (24.12) | (25.72) |
| *Interaction variable* *Distance to hospital | 8.347 | 2.492 | -8.831 | 19.288 |
| | (24.22) | (24.51) | (24.12) | (25.72) |
| *Interaction variable* *Distance to school | -26.928 | -5.871 | -19.803 | -37.012 |
| | (24.22) | (24.51) | (24.12) | (25.72) |
| *Interaction variable* *Poverty incidence | -47.609** | -37.998 | -53.684** | -36.113 |
| | (24.22) | (24.51) | (24.12) | (25.72) |
| *Interaction variable* *Flood, drought, and cyclone ev | -18.459 | 9.170 | -55.321** | -32.920 |
| | (24.22) | (24.51) | (24.12) | (25.72) |
| *Interaction variable* *Resettlement index | | -17.380 | | -25.278 |
| | | (24.51) | | (25.72) |
| Constant | 357.183*** | 351.071*** | 360.127*** | 353.957*** |
| | (13.46) | (15.51) | (13.39) | (15.60) |
| r2 | 0.107 | 0.098 | 0.115 | 0.099 |
| N | 2176 | 2192 | 2144 | 2160 |

# Table: Heterogeneous effects by attitude towards migrants and attitude to climate change

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *Dependent variable* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* | *Allocation of migrants* |
| *Sample* | *Control five* | *Treatment* | *Control five* | *Treatment* |
| *Interaction variable* | *Attitude to migrants* | *Attitude to migrants* | *Attitude to climate change* | *Attitude to climate change* |
| Cropland per capita | 48.743*** | 37.565*** | 14.473 | 33.931* |
| | (13.55) | (13.70) | (17.84) | (17.64) |
| Distance to hospital | 55.883*** | 52.844*** | 68.045*** | 68.127*** |
| | (13.55) | (13.70) | (17.84) | (17.64) |
| Distance to school | 40.626*** | 37.829*** | 43.652** | 15.990 |
| | (13.55) | (13.70) | (17.84) | (17.64) |
| Poverty incidence | 35.519*** | 31.430** | -17.375 | -3.382 |
| | (13.55) | (13.70) | (17.84) | (17.64) |
| Flood, drought, and cyclone events | 66.767*** | 57.748*** | 61.768*** | 25.186 |
| | (13.55) | (13.70) | (17.84) | (17.64) |
| Resettlement index | | 56.132*** | | 60.029*** |
| | | (13.70) | | (17.64) |
| *Interaction variable* *Cropland per capita | -8.638 | -43.424 | 54.030** | -8.917 |
| | (29.41) | (29.29) | (23.78) | (23.87) |
| *Interaction variable* *Distance to hospital | 25.770 | 64.500** | -10.860 | -0.526 |
| | (29.41) | (29.29) | (23.78) | (23.87) |
| *Interaction variable* *Distance to school | 8.285 | -6.814 | -0.736 | 33.414 |
| | (29.41) | (29.29) | (23.78) | (23.87) |
| *Interaction variable* *Poverty incidence | 64.392** | 0.757 | 118.647*** | 54.938** |
| | (29.41) | (29.29) | (23.78) | (23.87) |
| *Interaction variable* *Flood, drought, and cyclone ev | 53.838* | 19.831 | 34.542 | 59.596** |
| | (29.41) | (29.29) | (23.78) | (23.87) |
| *Interaction variable* *Resettlement index | | 66.055** | | 17.572 |
| | | (29.29) | | (23.87) |
| Constant | 359.615*** | 351.355*** | 357.183*** | 351.071*** |
| | (13.60) | (15.60) | (13.22) | (15.42) |
| r2 | 0.105 | 0.105 | 0.126 | 0.105 |
| N | 2144 | 2176 | 2176 | 2192 |

# Limitations

- We have used a sample of graduate students for our experiment, which means we are focusing on the **next generation of decision makers**. The extent to which **current decision makers in the area of social planning** would make similar decisions is more of an open question.
- Of course, **actual decisions** within a full bureaucratic and political context are going to be different from the hypothetical and relatively constraint-free decisions we have asked our respondents to make.
- **External validity** of our results to other countries should also be considered, the higher education sector in Bangladesh is substantially stronger than in many other developing countries, which could, on the one hand, lead students to get a better grasp of how the index in question is constructed, but, on the one hand, give them more of a background to make decisions based on their own assessment of the individual indicators.

# Conclusions

- This article has tested the effect of a migrant resettlement index on migrant allocation decisions, and found it to hold promise in influencing decisions.
- It makes **three** main contributions. **First,** we add to the understanding of the **behavioural side of composite index use**, essentially documenting a revealed preference among our respondents for having and using aggregate indices.
- Consistent with this, we show that the **weight respondents place on the index** proves to be increasing in the extent to which they believe the index was compiled by a competent research team, the ease with which it was conveyed in a clear and understandable manner, and the efficiency with which it can improve allocation decisions.
- **Second,** the **discrete choice approach** we adopt is particularly informative in allowing us to assess future decision makers' perceptions of the relative importance of host community characteristics important for resettlement capacity, as opposed to asking survey questions for one characteristic at a time.

- The advantage to doing so, as we show in this paper, is to get better information on the relative weights for the individual indicators included in decision making. In our control group, respondents put a particularly strong emphasis on **past adverse environmental events** when allocating migrants between locations, the impact being significantly stronger than for most of the other attributes (distance to hospitals being the exception).

- Respondents who grew up in locations with scarcity of cropland or frequent adverse environmental events, judged these attributes to be less important for resettlement decisions.

- **Third,** our analysis speaks to the more **technical literature on discrete choice experiments**. Since respondents are randomized into treatments, this does not reflect differences in background characteristics in the two control groups. For discrete choice experiments in general, this suggests that more effort should go into checking robustness of findings to alternative designs.

- And for randomized experiments like the one conducted here, it clearly suggests that if a treatment also leads to a change in design, as it does in our case, a second control group which can be used to assess the effects of such a change is absolutely essential.

# Concluding Remarks

- Therefore, the key message is mapping vulnerabilities and potential through the creation of aggregate indices under the conditions studied here, where perceptions of strong underlying expertise and ease of understanding the index have inspired confidence in its efficiency; the development and dissemination of these forms of composite information tools seem productive.

- However, this does not mean that technical challenges in compiling composite indices should be downplayed, the technical and behavioural aspects are in fact tightly linked as it is hard to convince informed decision makers of the usefulness of indices that might lack a strong basis.

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

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