

Quantifying the Evidence on Environmental Migration

A Meta-Analysis on Country-Level Studies

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Summary

There is a growing academic and political interest in the topic of environmental migration. Yet, despite an increasing number of quantitative studies, no scientific consensus exists as to what extent and under which conditions environmental factors influence migration.

This study provides a synthesis of the growing quantitative literature on environmental migration worldwide using a meta-analytical approach. We focus on macro studies, which estimate environmental effects over time using country-level data. We broadly consider estimations, which analyze the influence of different environmental hazards on migration outcomes. By extracting further information on study characteristics, the considered contexts, and sample compositions, we explore heterogeneities in effect sizes and potential mechanisms explaining environmental effects.

Environmental factors drive migration, but the size and direction of the effects crucially depends on the study context. While a large share of studies report a positive relationship, there is substantial heterogeneity in the findings. Rapid-onset events and temperature changes are most strongly related with migration. Middle-income countries are found to have higher levels of environmental migration compared to low and high-income countries. Conflict plays an important role both as a moderator and potential mechanism explaining environmental effects on migration.

Acknowledgments: This work was funded by the Austrian Science Fund (Z171-G11) and the Norwegian Research Council (236930/H20)

Motivation

Increasing number of quantitative empirical studies on environmental migration

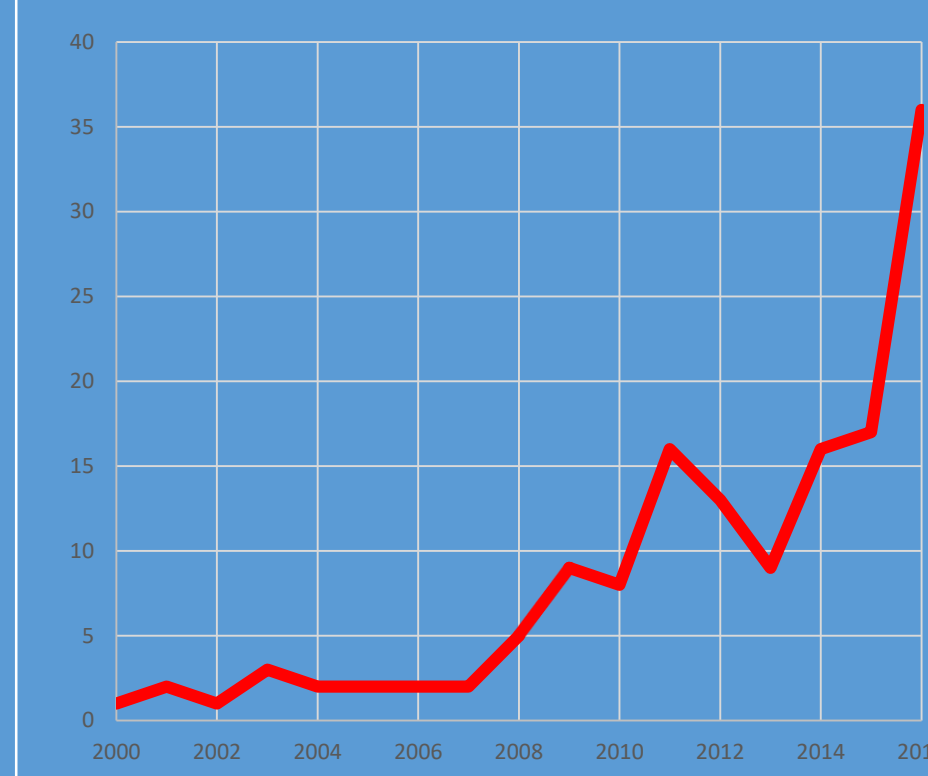
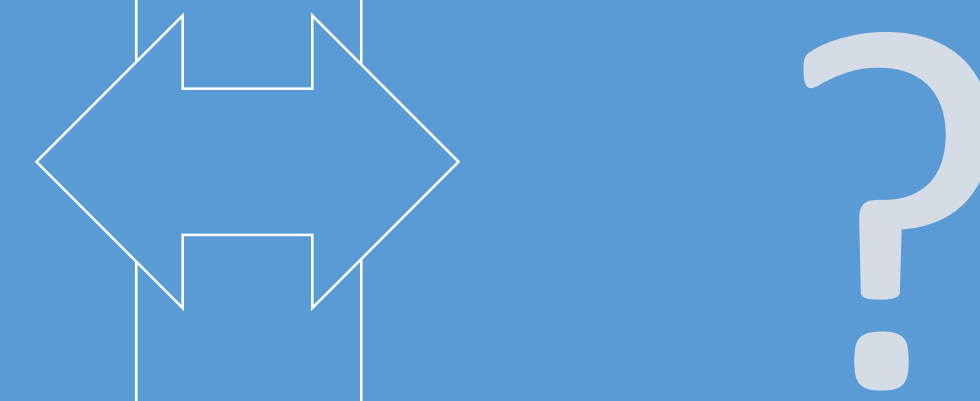


Fig - Number of quantitative studies on environmental migration since 2000

No scientific consensus how and under which conditions environmental change and variability influence migration patterns



Contribution of this study: Meta analysis of existing literature

- Comprehensively synthesize the statistical evidence on environmental migration using a meta-analytical approach
- Obtain statistical estimates of the size of internal and international environmental migration worldwide
- Study heterogeneities across studies and explore mechanisms

Design & Procedures

1. Broad search of relevant studies in the literature

Identification of more than 150 quantitative studies considering both internal and international migration. Focus on studies, which can credibly make causal inferences

2. Selection of studies from literature

For comparability, focus on macro studies estimating environmental effects over time using country-level data. Total: 30 studies with >1800 separable coefficients as study lines

3. Retrieving information of interest

Inclusions of panel estimates of any environmental factors on migration. Main challenge: Coefficients are not comparable → Standardization of effect sizes

4. Calculating average effect sizes

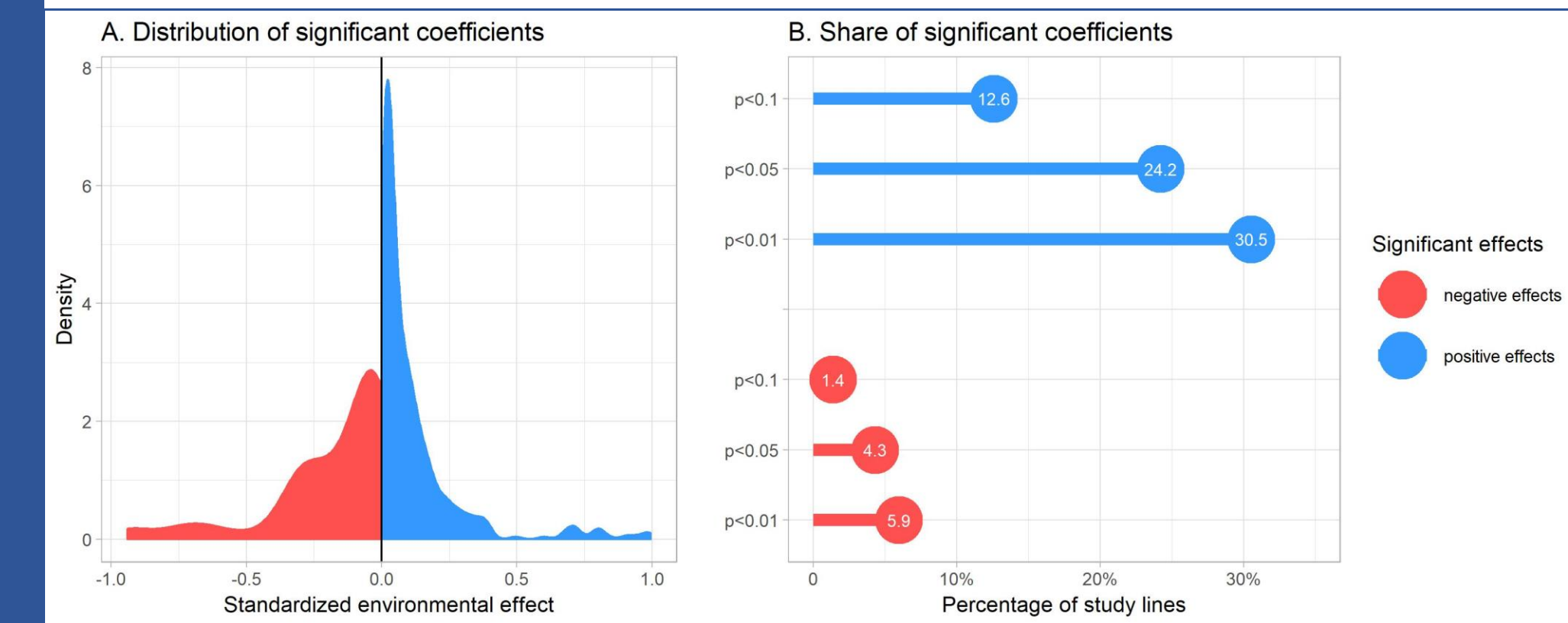
Calculation of average effect sizes by retrieving summary statistics on distribution of explanatory and outcome variables and ex-post beta standardization of coefficients

5. Performing meta-regressions and further analyses

Analysis of the standardized coefficients (sd change in migration with 1 sd change in environmental factor). Particular focus on the role of mechanisms and contextual factors

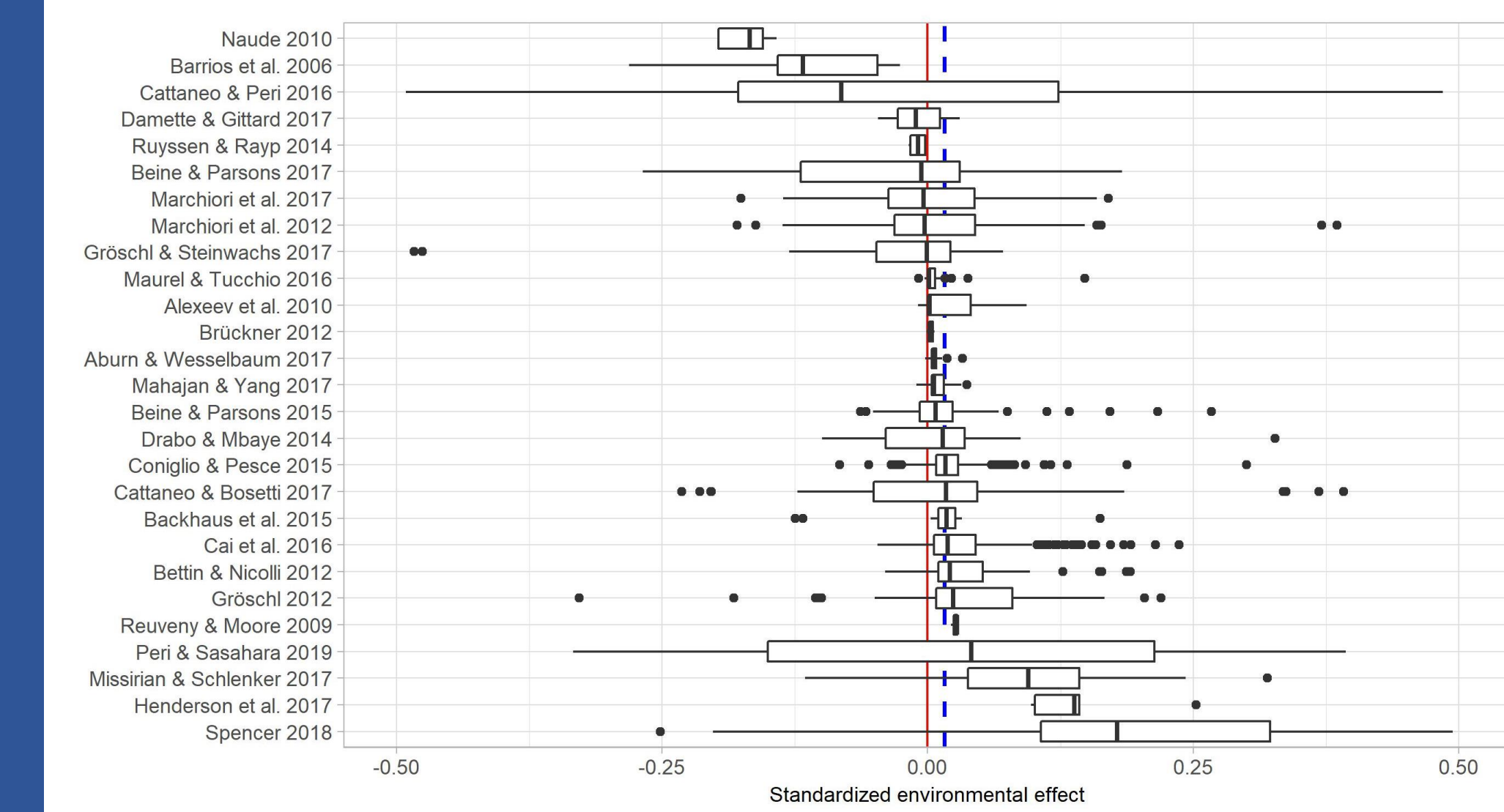
Findings

The strength and direction of the relationship between the environment and migration



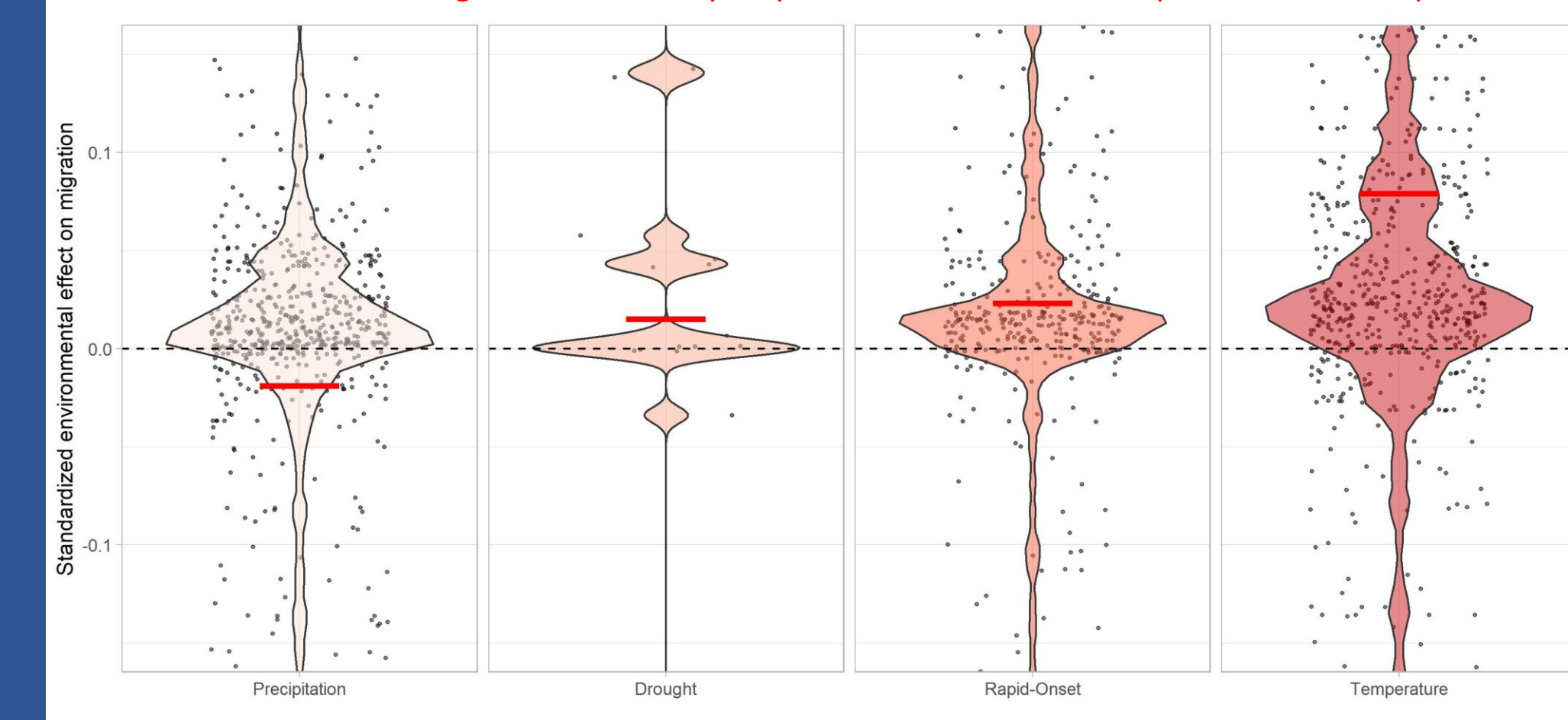
A large share of studies report a significant positive relationship between environmental factors and migration (24.2%, $\alpha=0.05$). Few studies find a significant negative relationship (4.3%, $\alpha=0.05$). The majority of coefficients is insignificant. The average effect size is with 0.03sd positive, but close to zero.

Exploring differences in effect sizes between the considered macro studies



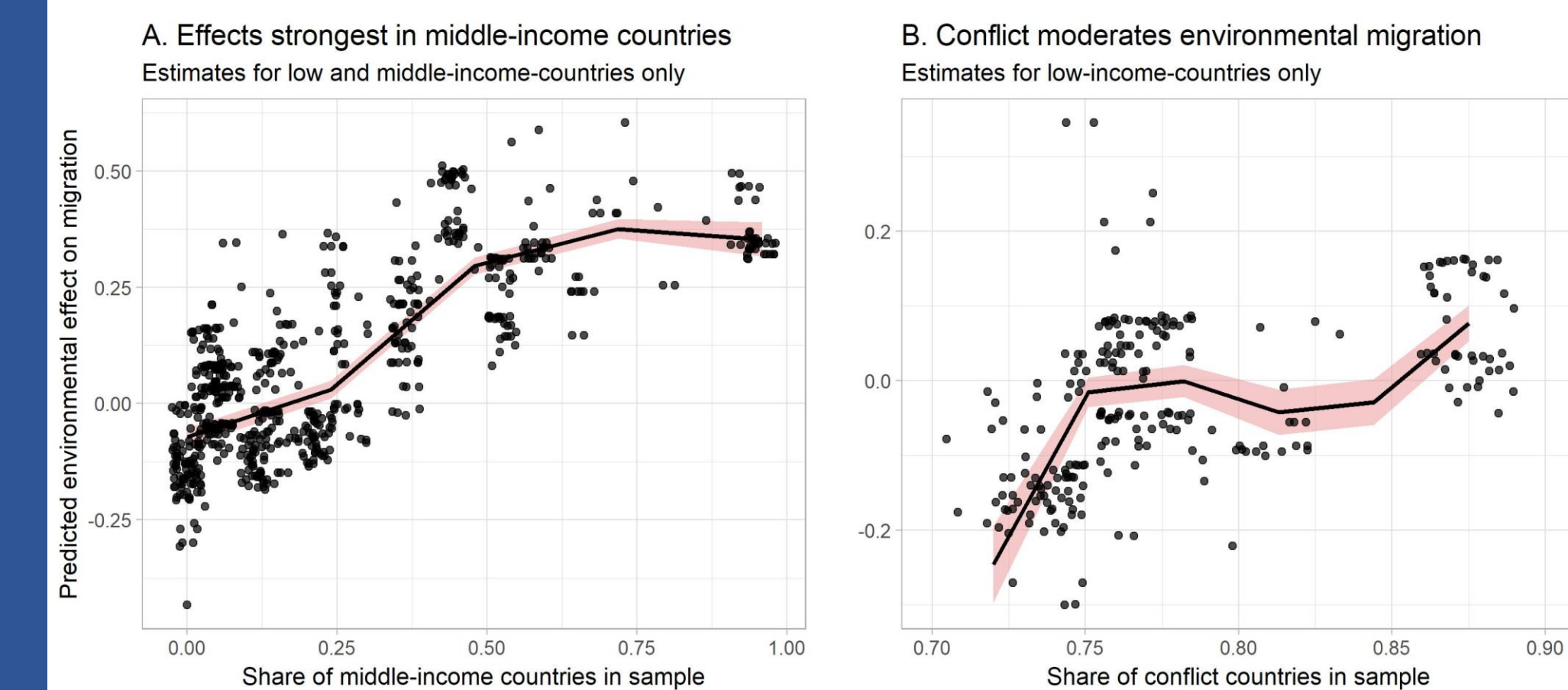
Substantial heterogeneity in effect sizes across studies. Strength and direction of the relationship between environmental factors and migration varies from study to study. Even within studies, effect estimates vary considerably. Accordingly, average effect sizes are not informative, but have to be seen in context. Importance of exploring underlying factors and mechanisms driving the effects.

Different hazards affect migration differently. Rapid-onset events and temperature most important



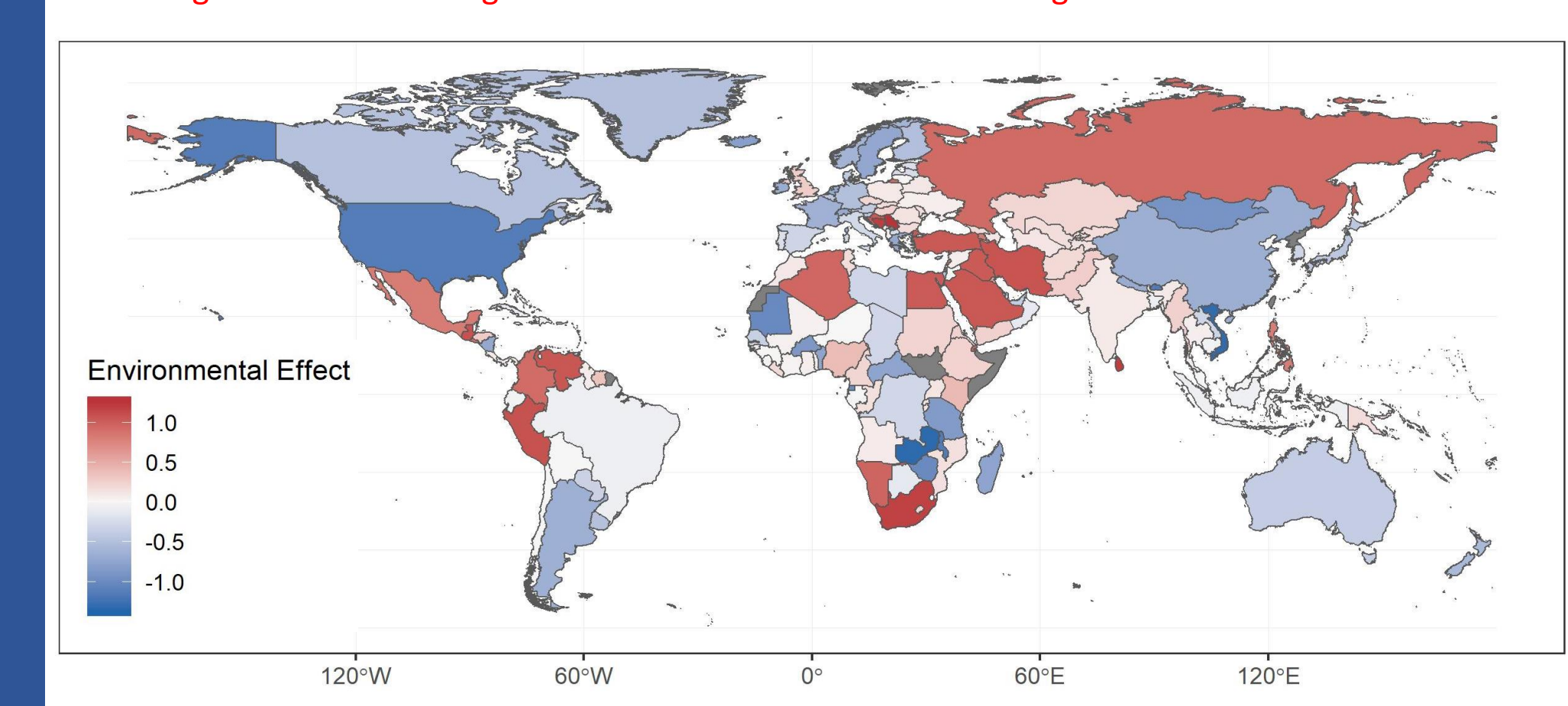
Migration response is strongest for rapid-onset events and temperature level changes. Precipitation also has an effect on migration, but only changes in its variability. The effects are most pronounced shortly after the environmental event and fade over time. Conflicts are found to be one potential mechanism explaining effects.

Analyzing the role of study sample composition in influencing the environment-migration relation



Effect sizes depend on sample composition. Studies with higher share of middle-income countries report stronger migration responses. Environmental migration is weaker in low and high-income countries. Effects are also stronger the higher the share of countries in the sample, which experienced a conflict in the past.

Predicting environmental migration worldwide based on a meta-regression model



Environmental migration strongly depends on local context. Based on different models, we predict expected migration responses for different countries. While increased levels of environmental migration are predicted for the MENA region, LAC, and Southeast Asia, environmental hazards have no or negative effects on migration in wealthier countries and in SSA.